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Picture Frame Making for Amateurs:

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PRACTICAL INSTRUCTIONS IN THE MAKING OF VARIOUS KINDS OF FRAMES FOR PAINTINGS, DRAWINGS, PHOTOGRAPHS, AND ENGRAVINGS.

ILLUSTRATED.

By JAMES LUKIN, B.A.

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PREFACE.

ALTHOUGH the art of producing pictures is thousands of years older than that of making frames, yet when once the latter were introduced the former gained considerably in appearance. Indeed, when mural decoration had succeeded the rude sketches upon the naked rocks and stones, and frescoes were in turn replaced by works of a portable character on panel and canvas, some kind of frame became absolutely necessary to form a border to the composition and to isolate it from others. The earlier frames were doubtless of a very simple character, but were soon succeeded by handsomely carved work, often of exquisite taste and finish, and indicating frequently, in the case of a portrait, the favourite pursuits of the original. Such is the carved frame around the portrait of Izaak Walton, in the hall of Brasenose College, with its rods and tackle, goodly trout, and other details of the fisher's art and skill. Artists of good repute engaged in this carved work, the frame being prepared for the exercise of their skill by the carpenter or frame maker, who, in that case, merely fitted the parts together. This work was, of course, of a costly character, suited only to the canvases of artists of acknowledged celebrity employed by the rich; others were content with plain wood frames of the simplest kind, and often very badly painted to imitate foreign wood. Gilt frames after a while superseded in a great degree those elaborated by the carver, and composition ornaments replaced the more costly ones cut from the solid.

Of late years these gilt composition frames have been more generally used than any others, especially a design known as Alhambra—a rich

moulding of bold character, with generally a broad plain mat inside. They are got up very cheaply, even when the best gilding is used, and at a still cheaper rate when copper leaf, lacquered, is substituted for the real gold. Yet of these frames I have said but little in the following pages, because an amateur would not succeed in making them; but, at the same time, he might, perhaps, be able to repair a frame of which a part of the moulding or ornament had been accidentally broken. These pages are accordingly devoted to wooden frames requiring neither many tools nor expensive materials, and include those in which the fretsaw alone, or in combination with the carving tool, comes into use. Oxford frames, which of late years have been deservedly in high favour among amateur frame-makers, are introduced, both of the original simple form, and more or less elaborately decorated. Picture-frame making affords great scope for skill and taste, and the lighter kinds of frame are within the capabilities of the lady amateur, who may pass many a delightful hour in this useful pursuit.

J. L.

Picture Frame Making for Amateurs.

CHAPTER I.

NECESSARY TOOLS AND MATERIALS.

Introductory—Mouldings—Mitre Block and Shooting Board—Mitre Board and Mitring Box—Clamping Board—Standard Sizes of Frames—Sawing and Planing.

There never was a time when it was so easy as it is now to obtain good pictures at a low cost. The splendid works of the ablest artists exhibited year by year are engraved, chromo-lithographed, or otherwise reproduced in great numbers, and wonderful is the accurate and faithful rendering of the originals in these cheap productions.

The Christmas *Graphic*, *Illustrated London News*, and the *Queen* supply many well executed pictures of this class worthy of being framed and glazed, although we often see them merely nailed to the wall or pasted upon a screen, when much of the power of colour is lost by approximation to other tints, which brings harmony into discord. If a picture is well coloured it ought certainly to be worthy of a frame; and this can not only be cheaply, but easily made to any size, by the help of a few plain tools.

Mouldings, ready rebated to receive the glass and backboard, and nicely gilt, can be procured by the foot run, the price varying according to quality and width of the material, the mere round beading so extensively used for water colour drawings being exceedingly cheap. These need

only to be sawn to a mitre or angle of 45deg., and glued up at the corners, with the addition of a sprig or two, or small brad, to give strength to the joint. The mitres can be cut either with a fine tenon or mitring saw, a fret saw, or by means of a circular saw fixed in the lathe, but in any case a very fine tooth is requisite if the moulding or beading is ready gilt, or the gilding will be chipped off.

It is not easy to saw an accurate mitre without a special but simple appliance called a mitring block. This may be easily made at home out of a bit of dry board with two strips to guide the saw, or merely of two boards in the following way: Plane up a bit of dry sound elm, beech, or ash, about 18in. long by 12in. wide, and $\frac{3}{4}$in. thick, trueing it on all sides. Plane up a second bit of stuff, but only 9in. wide and 1in. thick; glue and screw these together, so that a step is formed 3in. wide. (See Fig. 1.) Now mark lines *a*, *b*, and saw them with a tenon saw

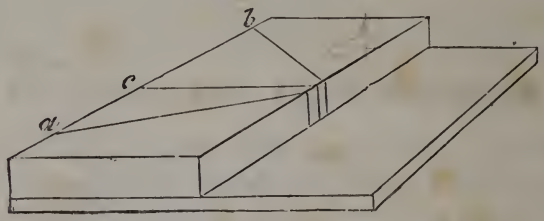

Fig. 1. Mitre Block.

quite through the upper board down to the lower one. These saw cuts are to be square to each other, and they must also be quite accurately perpendicular to the lower board. The result will be that if a piece of beading is laid on the step, and the tenon saw placed in either of the two saw cuts as a guide, the beading or moulding will be sawn off at the angle requisite to form a mitred joint. One piece is, of course, sawn by the left hand saw cut, and the other by the right hand one. The moulding, or other strip, must be held steadily against the back or "riser" of the step. A third saw cut at *c*, at right angles to the length of the boards, will form a guide by which to saw a strip squarely across, instead of at a mitre.

Fig. 2 is a mitre block and shooting board, upon precisely the same principle, but made somewhat differently. Instead of a second upper board, two strips of any tolerably hard wood are screwed down to the base; these making with each other a right angle, but forming a

mitre with the line *a*, *b*, which is that on which the saw is to work. To facilitate its accurate guidance, this board may also be made as a very shallow step if preferred. The angle, however, formed by the meeting of the strips is always sawn off so as to give a sufficiently broad face to rest the saw blade against. To cut a piece off square it is placed against one strip, and the other is used to guide the saw. By making the guide strips of good thick stuff, say two-and-a-half-inch square, and then cutting a saw kerf through them in the line *c*, *a*, for a guide to the saw blade, this becomes, perhaps, somewhat more reliable, especially for amateur's work. For small light beading no subsequent planing of the mitred ends should be needed, as the somewhat rough surfaces left by the saw hold the glue better than perfectly smooth ones.

The ordinary mitre saw is often too coarse a tool for frame making, and should be replaced by a finer one, purchasable at the tool shops,

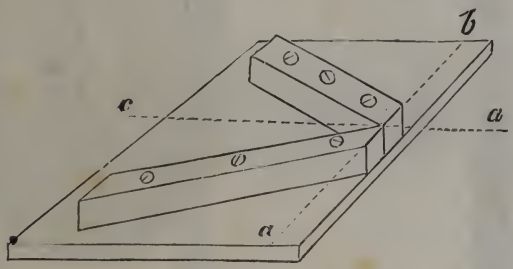

Fig. 2. Mitre Block and Shooting Board.

and generally made with a straight handle and brass back, but the saw kerfs should be made by the same saw that is intended to be used in the work. The fine frame saws are rather difficult to keep accurately in the saw kerf, but cut beautifully if care is taken in this respect. There are, as might be conjectured, mitring machines some of which are reported to make good work. Mr. Chas. Churchill, of Finsbury, I think, imports one from America, and Mr. E. Hines, of Norwich, sells a very good tool, with apparatus for holding the frame together while it is being nailed up. For any one intending to make frames in quantity this latter machine will be found of great value.

The circular saw and fret saw also both furnish ready means for rapidly mitring mouldings, if fitted with the necessary adjustable blocks for securing the stuff at the proper angle. A lathe is, of course, necessary for carrying circular saws, unless they are fitted upon a

separate special stand. The drawing, Fig. 3, albeit the saw teeth are accidentally reversed, and would cut backwards, will suffice to explain one easy way of fitting a saw to the mandril of a lathe. A is a spindle or mandril of ash or hard wood, into which is securely screwed an iron bolt, which should then be turned in its place, with a shoulder at B B (see Fig. 4) to carry the saw, represented by the arrow. The end of the bolt is then chased with a screw thread and a washer (A, Fig. 4), and nut fitted upon it. The part D (Fig. 3) represents a worm or taper

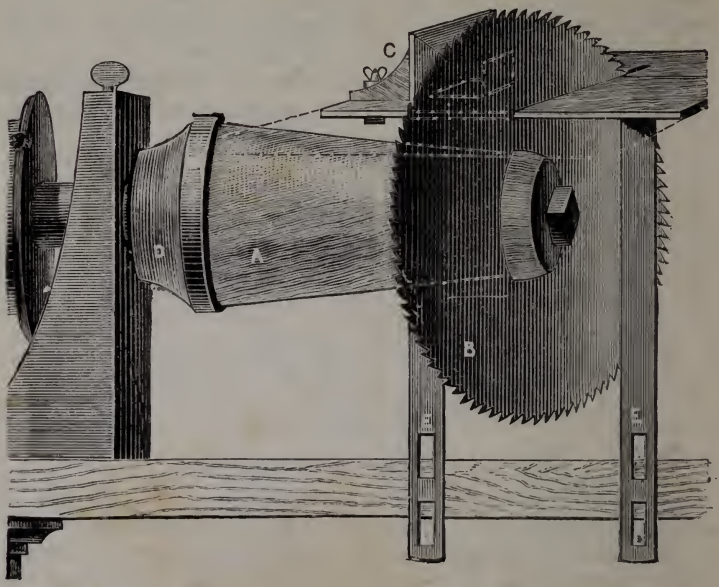

Fig. 3. Circular Saw, Mounted on Wood Chuck.

screw chuck, to which the wooden spindle is attached. C (Fig. 3) represents an upright adjustable guide, against which the piece of moulding is slid along into cut, and this, being made to form with the saw an angle of 45deg., insures the accurate formation of the mitre. The saw table to which the guide is fixed by a thumbscrew is itself supported by legs, E E, which can be elevated or lowered by means of the slots and thumbscrews (not shown in the drawing). These legs attach to a short poppet or block, fitting between the bearers of the lathe, and secured in the usual way by a holding-down bolt and bow nut.

Some fret saws are purposely fitted with a guide for sawing picture frame mouldings, and answer well enough for the lighter material used for small frames, but they are of no use in the case of heavier mouldings. For the latter it will be generally better to use a hand mitre or tenon saw.

The shooting board is made to enable a plane to be used on the sawn ends of the beading or moulding. It is made like the second mitring block (Fig. 2), but with a step, in which the plane lies on its side when in use. Of course, the body of such plane must have flat sides, like an ordinary jack-plane, so as to rest firmly upon the board, which takes its weight. The strip is then held securely against one or other of the guide strips, so that its end projects over the step very slightly, bringing it in contact with the plane iron. The latter must be very finely set, so

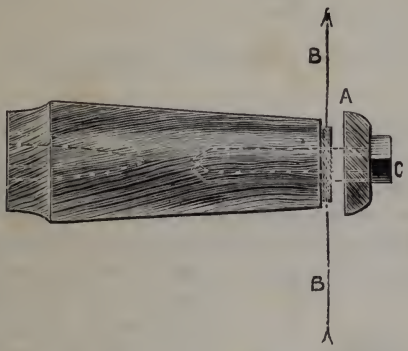

FIG. 4. MODE OF FASTENING SAW.

as to take but the thinnest possible shaving, or it will split a bit off the moulding. I believe a special plane has been introduced for this work, in which, when it is lying on its side, the handle or toat is on the top.

Two other forms of mitre boards, or rather a mitre board and box, are made, of which one is illustrated in Fig. 5, A, the other at Fig. 5, B. In the first a solid block of hard wood is screwed down to a base board, the sides (a, b) being at right angles to each other, and a saw cut is made to guide the mitre saw. The moulding is laid against a or b. This is easy to make, and a good form. It is as well to cut off the extreme angle where the sides meet at c. B is a rectangular box of mahogany, in which to lay the strips to be mitred. Saw cuts are made as before to cut right or left bevels, and another at right angles, which often proves useful for other work.

I shall not say anything here about planing up mouldings, because they are so readily procurable at most of our towns, and a complete set of moulding planes involves a considerable outlay. I may, however, call

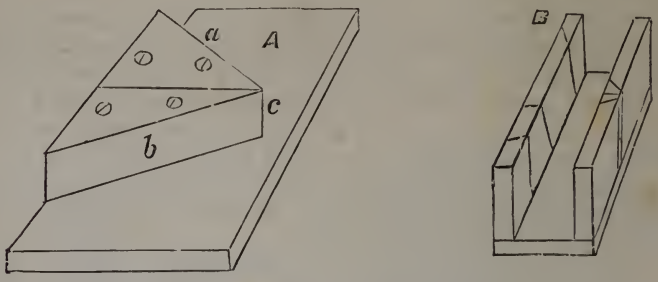

Fig. 5. Mitre Block and Mitring Box.

attention to the fact that picture-frame mouldings are made thick enough to allow of cutting a rebate, which ordinary moulding is not—at least, it is so very seldom.

An inspection of the section of such an ordinary bit of moulding (Fig. 6) will explain this, as well as the only available remedy when such stuff is a matter of necessity. It will be noticed that the moulding is worked quite thin just at the edge, where it will be necessary to rebate it to admit the glass and backboard. If, therefore, a rebate were attempted at this part, the strip would be cut through and the frame spoilt. In picture-frame mouldings the stuff is left thick to take the rebate. The only way to meet this difficulty is to glue on an extra thickness, and leave a quarter of an inch or so next the thin edge uncovered by it, which is the same thing, in effect, as cutting away the stuff. Of course, this extra bit will have to be coloured or stained to match the rest, but it will seldom or never have to be gilt, as gilded mouldings are not likely to be bought for frames, unless it be those specially manufactured for that purpose, which will therefore have been previously rebated. When it is necessary to glue on an extra thickness

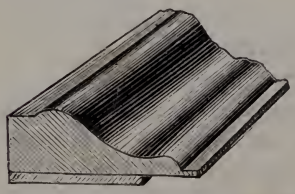

Fig. 6. Moulding with added Rebate.

in the way suggested, this should be done before mitring, so as to cut both at once, to insure a better joint.

The next consideration is the glueing or nailing the pieces together. For the purpose of holding the strips in position, several patented devices have made their appearance, all much on the same principle, being screw clamps variously arranged. But if the amateur will make his frame to standard sizes, he will find it easy to contrive clamps which will cost pence instead of pounds. Get a bit of seasoned deal board, or dry ash, or any other stuff that is really dry and sound, an inch thick, and large enough for the size of frames required. If larger than the width

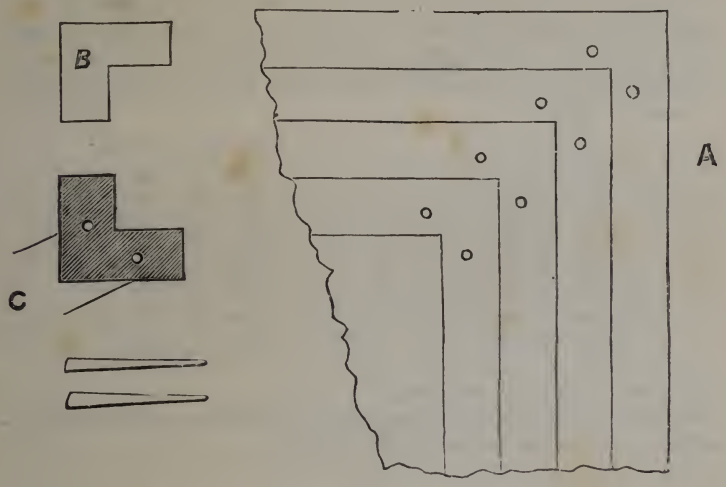

Fig. 7. Clamping Board for Mitred Frames.

of such board, two or more must be glued up. Plane all perfectly level, and square up neatly, or get the work done by a carpenter thus far. Screw on at the back a couple of strips to prevent the board from warping or twisting, and you have the main work done. Let Fig. 7, A, represent a part of this board. Now rule lines, squares or oblongs, representing a series of standard sizes of frames, and at each angle bore $\frac{1}{4}$in. clean holes, as shown. Next make four clamping or corner pieces, like B, of any tough wood—not deal, or it may split; and underneath, as marked at C, put in two iron pins (screws, with their heads afterwards sawn off), and let them stand out $\frac{1}{2}$in. or so. These pins are to be made

to fit the two holes at any one of the marked corners. Then make eight thin wedges of hard wood, and you have a very useful clamping frame, the advantage being that the picture-frame mouldings lie flat upon it and out of twist. Glue up first both ends of one short strip and one of each long strip, and, having put two of the corner blocks in place, put the frame, made thus far, against them. Glue and put in place the other short bit, and then place the other two blocks. After this take two or more of the wedges, and, giving them a slight tap, drive them between the strips and the blocks, and leave till dry.

With a few extra packing strips—merely strips of deal—nicely squared up, you can make one setting of the corner blocks serve for a smaller frame, if you have to make one now and then not quite of your standard size; but it is always of advantage to use standards, because artists' canvases, millboards, and sketching blocks are so made. For landscapes, the usual sizes are as follow (for portraits square canvases are used):

Landscape Sizes.	Portrait Sizes.
9in. by 5in.	8in. by 6in.
6in. by 7in.	10in. by 8in.
14in. by 10in.	12in. by 10in.
16in. by 12in.	14in. by 12in.
18in. by 12in.	17½in. by 14in.
24in. by 18in.	21in. by 17in.
30in. by 30in.	24in. by 20in.

and so on up to any size required.

Water-colour paintings are nearly always mounted on white cardboard, which can, of course, be cut to any size suitable.

CHAPTER II.

MITRED AND VENEERED FRAMES.

SIMPLE MITRED FRAMES—MITRED FRAMES WITH AN INNER MAT—METHOD OF CLAMPING FRAMES—MITRING—VENEERING FRAMES.

A GREAT many of the plain beading frames for water colours are put together without the aid of glue; and these, therefore, are not held in such a clamping board as that shown in Chapter I. at Fig. 7. The workman having cut the mitres correctly, fixes one strip in his wooden bench vice, with one end upwards, and, holding the strip which is to be nailed to it in place, bores with a bradawl the necessary holes, and gently drives in one or more tolerably long brads. But in doing this the tendency is for the sloping surfaces of the mitres to slide one upon the other, so that when the brad is driven home the result would be as in Fig. 8, A. Hence in placing the surfaces in contact he does not lay them exactly in their ultimate position, but as in Fig. 8, B, and the driving of the brad will then bring the corner truly together. After this brad has been driven home, a second can be put in the other way, *i.e.*, so as to stand at right angles to the first, the head now being in the other strip. After one corner has been done, joining two strips at right angles, the other two should be similarly joined, and then the third corner worked. In Hines's apparatus the frame is securely held while the boring and nailing are being done, but the operation of putting a plain frame together is tolerably easy without any special contrivance of this kind for securing it. In point of fact, regular workmen rather despise appliances that are a confession of want of skill, and they will do work a great deal quicker and better by hand alone. But the amateur cannot spare time to serve such an apprenticeship as that to which a workman has to submit, and his second-rate skill is therefore necessarily supplemented by the various mechanical aids to handi-

craft which empty his purse, but enrich the shopkeeper, and no great harm is done to any one.

In making wooden frames, not gilt, but with an inner mat or "slipping," as it is technically called when but narrow, the main frame of moulded maple or other wood is made as before, and then the mat is cut to fit the rebate, which would otherwise have held the picture with its glass and back board. This slip or mat has to be carefully mitred, so that the line at the angle may lie straight with that of the outer frame, or it will not look neat and workmanlike, but just as if the mat belonged to some

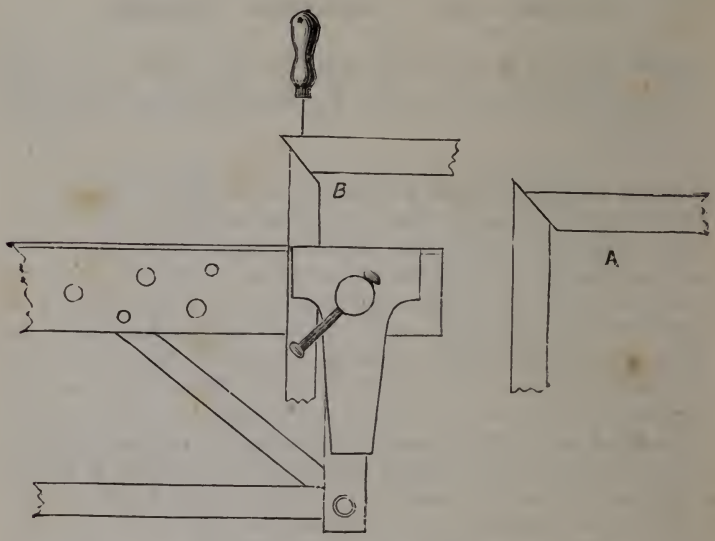

Fig. 8. Nailing up Mitre.

other frame, and had been used by mistake. Care in measuring each length will insure this. The outer frame should, in fact, be put together first; next the mat pieces fitted carefully by actual measurement of them, and then placed in the frame. For it must be remembered that in such an article as a picture frame, which always invites inspection, an open joint or a crooked one is enough to stamp the whole work a failure—an amateur's miserable attempt at a job to which, simple as it is, he is unequal.

The mat itself, if nailed up at all, will need extra care, because it is

so thin compared with its width; but as it is always protected from injury by the more solid frame which embraces it on all sides, a little glue will suffice to hold the mitre joints together. In glueing up such a mat, let it lie flat upon a board or table where it can be placed quite level, and so as not to become in any way twisted.

There is another way of clamping a frame together while the glue is drying which will often answer very well—viz., tying it round with a bit of stout twine, first putting on corner pieces at the angles. Fig. 9 (A)

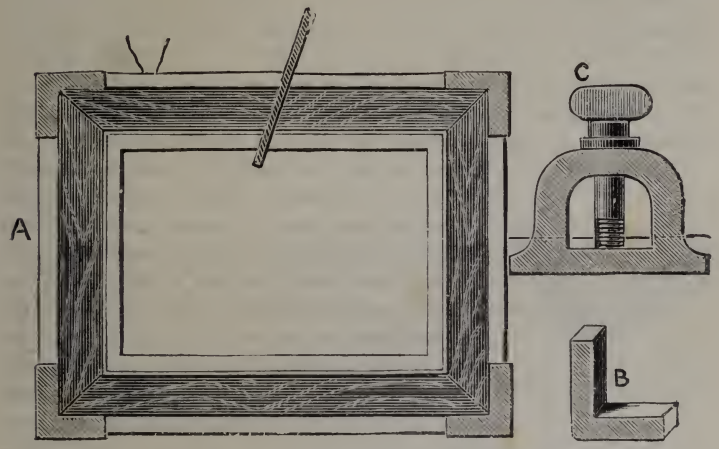

FIG. 9. CLAMPING FRAME, WITH STRING.

represents a frame thus secured, and B a corner piece. Sometimes this plan is further elaborated by some special appliance for tightening the cord. The simplest is to insert a bit of stick in a double string, and to twist the latter the same as in a carpenter's turn or bow saw. Another is to place wedges under the string, or to use a clamp like Fig. 9 C, winding the string as in tightening a fiddle-string. Whichever plan is used, the frame, when put together, should be placed on a flat board or bench, to insure its being out of twist. In any case, moreover, it should be put together first without glue or nails, to test the accuracy of the mitred joints, as it may happen that another light stroke of the plane may be required to make the bevelled pieces lie quite close together.

In regard to this shooting of the mitres, it is well, as I said before, if a fine saw be used, to allow the rough surfaces to remain to give a

better hold to the glue; but unless the cut is very fine and accurate, the plane will have to be used. This plane must be very finely set and exceedingly sharp, and should be kept solely for fine work. There is a small light plane made on purpose, with one iron, *i.e.*, without the "break iron;" and, used with a well-made shooting board, the work can hardly fail to be accurate. A mitre may, indeed, be ruled with a pencil and sawn, but the chances are against its being accurate, and it is a poor way of working, especially if frame making is to be taken up as a recreation.

Unless the amateur frame maker be a really good hand at joinery, I advise him also to let a carpenter make the shooting board and mitre block, because the slightest inaccuracy in either of these will spoil all the work done by their means. If the saw cuts, for instance, are not truly perpendicular to the base board, or the mitre be not true, it will be impossible to make the joints fit together closely, and they will be weak as well as unsightly, because the parts will not be in close contact. After glueing up a mitred joint there is generally added what is called a key, which is a slip of veneer or a slip of any hard wood let into a saw cut at the angle, such saw cut not being made quite in the direction of the grain of the wood of the frame, but sloping downwards as shown at A (Fig. 10). This slip is then cut off flush, and does a great deal towards holding the joint firmly together. Sometimes two or more keys are thus glued in, rendering the joint somewhat like a miniature mortised-and-tenoned one. It will often happen, especially in framing a large water-colour drawing or an oil painting, that the moulding to be obtained is not of sufficient width or thickness. It then becomes necessary to build it up, as it were, to the requisite dimensions. If this be done, it will be also found necessary to back it with other pieces to bring all to a level. This sort of frame being subsequently covered with compo and gilt, the way in which it has been glued up is not seen, except to a certain extent at the back, where the wood is bare. As a rule, it is not likely that an amateur will undertake to manufacture such heavy frames as these, or, indeed, to try his hand at gilding them. They can, however, be purchased ready for gilding, and so also can compo ornaments for the corners of the more simple and light frames, and by means of Bessemer or Judson's gold paint, a very fair job may now be made of the gilding. Of this, however, I shall speak fully farther on.

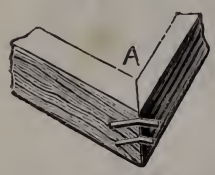

Fig. 10. Mitre Keys.

Veneering picture frames is not an art that is likely to be successfully

practised by an amateur, except for flat surfaces. To apply it to mouldings needs special tools and an apprenticeship, for which no written instructions will prove a substitute. It consists in laying a thin covering of some handsomely grained and coloured wood upon a plain foundation of deal or other cheap material. The process is not difficult upon small and flat surfaces, but requires to be carried out quickly and with precautions, to be explained presently.

To veneer picture frames, merely planed to a bevel and free from curved mouldings, is quite within the capability of the amateur. The reason that curved surfaces are difficult to manage is because every part, after being glued, must be subjected to strong pressure in order to force out all waste glue and retain the surfaces in the closest contact till dry. This needs exact counterpart mouldings, which for large-sized articles are of iron, and are called cauls, or in other cases they are of wood. Very simple mouldings, such as the ogee, will fit each other, and thus mutually act as cauls, and a certain amount of success may be obtained by tying two such together. But I do not by any means promise the novice that he will obtain good results in curved work, even when small, though he may very fairly succeed in flat and plain bevelled frames. The veneer can be readily purchased from dealers in hard wood, who will also supply plain strips and boards of various handsome foreign woods; and it is in reality scarcely worth while to go through all the trouble of veneering if the cost of solid stuff is but small, as it will be for mere strips an inch or two in width. It is very different when a number of frames of good size are needed, as the foreign wood, if used in the solid, would then become too costly.

For veneering, two extra tools will be required, namely, a toothing plane and scraper, the latter being merely a piece of saw plate ground square on the edge, to give two cutting angles, and the former being used to score lines on the under side to hold the glue, and also to work such cross-grained and knotty stuff as would not be amenable to the cutting powers of the ordinary plane. A piece of broken glass is sometimes a more convenient scraper than a steel one, especially as it will often break with a curved edge, like a miniature scimitar, which will work into hollows. Oak frames (especially pollard oak), rosewood, yew, and other stuff with knots and crooked grain, are obliged to be thus worked, though some can be mastered with a plane having a more upright iron, which, however, must then be an additional purchase. The plane alluded to has one side of its iron channelled from end to end with a series of small grooves, so that, when ground, it has a serrated edge, like a plane very evenly and finely notched. This is worked in all directions upon cross-grained stuff, which, of course, it does not leave with

a smooth surface, but only levelled down evenly and with a uniform grain. The surface has then to be worked by the scraper, succeeded by coarse and fine glass cloth, Dutch rush, or pumicestone, until it becomes fit to receive a coat of filling, and subsequently of varnish. Filling is a composition of thin glue and plaster of Paris, used to stop up the open pores of the wood and prevent the polish from soaking into it. Very often thin glue alone will answer the purpose. Either must be allowed to get dry and hard, and must then be rubbed down to a perfectly smooth surface before the varnish or French polish is applied.

To veneer a flat surface, such as that of a plain or bevelled frame, it will be necessary to cut out the veneer nearly to size, but rather larger each way than necessary to cover the wood on which it is to be laid. The veneer may be first soaked or sponged with hot water to render it pliable and soft, so as to allow it to be cut with a strong knife; or it may be cut when dry and hard with a fine saw. It must, however, be soaked before being laid on a curved surface, and it is better to wet it thoroughly with hot water, even for a level surface. The toothing plane may first be run over what is to be the under side, leaving the upper till afterwards. The frame of plain deal may be put together first and veneered afterwards, but it will often be advantageous to veneer it even before sawing the mitres, so as to cut the two woods together. This will insure a more accurate joint in the veneer than if it is cut separately or laid on after completing the frame. The real secret is hot glue and hot stuff. If the glue is chilled before the union is complete, it is hopeless to expect satisfactory work.

Veneer is laid with the aid of a hammer, which is made on purpose, with a broad flat pane on one side of the head, by which it is chiefly held. This flat pane is used to press down the veneer and squeeze out superfluous glue, with a sort of "walking" motion. It is not used, therefore, to strike the work, but only for pressing it in all directions. The wood being then sawn, and wetted with hot water to take out obstinate bends and curls (but left hot and damp rather than absolutely wet), take a brush and spread hot and somewhat thin glue rapidly over the work, both the veneer and the other, and instantly place the pieces together and rub them down, working from the central part towards the edges, so as to press out all air bubbles. If you see that any part has not stuck, press on it a hot flat iron to re-melt the glue, and go to work again with the hammer. Such narrow stuff, however, as a picture frame needs, will not be likely to give much trouble of this kind, nor will a veneering hammer be absolutely necessary, as a common one with the usual pane can be used in a similar

manner, or even the edge of a short bit of wood roughly wedge-shaped. Anything that will aid in pressing the veneer down will suffice, and with narrow stuff it will answer to put on a couple of screw clamps, or to bind with a bit of stout string till dry. After all has stood four-and-twenty hours—if satisfactory, as it ought to be—it remains to plane the edges truly, and to work the flat side with the toothing plane and scraper, if it is of a kind for which an ordinary smoothing plane finely set will not suffice. There is nothing better for the latter tool than the iron planes sold at Churchill's, in Finsbury, which come from America, and are capable of being set more finely than any wooden plane. I see that they also sell a bull-nosed rebate plane, to work right up into a corner, and an adjustable scraper for veneers; likewise, screw clamps of iron, at 4s. a dozen.

CHAPTER III.

ROUND AND OVAL FRAMES.

Frames Cut in the Lathe — Frames for Medallion Portraits—Method of Describing Ovals.

Being asked one day to cut out in the lathe some circular pieces of wood to renovate a toy horse which had fallen lame in the off wheels, I chucked on the taper screw chuck a square bit of $\frac{3}{8}$in. deal, about 3in. each way, and already planed on one side. I then applied a parting tool to the face, and cut out the wheel which remained on the chuck, while the square of wood remaining fell off. Taking this up, it struck me that if it were blacked it would do for a frame for a small photograph, and so it did; and a similar one, cut in the same way, but bevelled inside by holding the tool at an angle, made a still better by gilding the inside where it was thus bevelled, and leaving the rest black. Fig. 11, A, B, and C, show frames thus made, the latter two with ornamental nails and studs added, and with a ring by which to suspend them. They are not of so artistic an appearance as when the central hole is elliptical instead of round, yet they answer well enough for the purpose suggested, and are certainly easy to make at a nominal cost.

Some years ago oval and also circular frames were much in vogue for miniatures or portraits in profile cut out of black paper and mounted upon a white ground. They do well enough for photos, and are easily made complete in a lathe, being simply cut out on the outside as well as on the inside and worked with a moulding, and also frequently decorated with beaded work. The moulding was large and deep in proportion to the size of the frame, and the whole was very often got up entirely in black, though more expensive ones of a similar shape were gilded. It will not be necessary to illustrate these, because they are easily understood without. Turn an oval or circular ring of sufficient

substance to allow the moulding to be worked with beading tools and gouge, or with the moulding tools specially shaped for such work; and having in this way formed the face to suit the taste, turn the work over and cut out the rebate at the back, or reverse the process and cut the rebate first, which is better. Fig. 11, B, is meant to represent a frame with a beading formed of white-headed nails, which are sold at ironmongers'. The beads are of china or enamel of some sort, and on a black frame look very well. But in making a frame thus it is difficult to insure the circle being of the exact size to bring the nails close to each other, or to get them at equal distances apart if not close. The best way is to make the frame in card, or to describe a circle on card and stick the nails in all round it. If too small or too

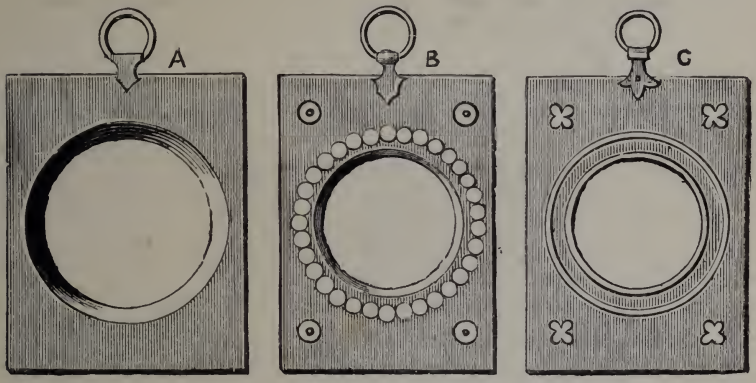

Fig. 11. Frames Cut in the Lathe.

large to exactly take the nails, try another, and when one is found exactly the size required, make a wooden frame to match it.

Instead of using nails, the turner will form these beads out of the solid material, using a bead drill in the slide rest, with overhead apparatus, and spacing them out by means of the division plate on the mandril pulley. This can be tried round to see how the beads will come, but presents far less difficulty than nail work, especially as the latter may split the wood unless each has a hole for the nail first made. There are many patterns of ornamental nail made, some of which have little round washers of ivory below the actual head. In the country I have had much difficulty in procuring the better kinds, but in London, wherever brass fittings are sold for upholsterers, there is generally

plenty of choice for these articles. I remember seeing a supply of all kinds of these fittings, called, I think, by the generic name of brass furniture, including ornamental nails and hinges, brass screws, corners, and edgings for boxes, ornamental locks, *et id genus omne*. A very plain frame becomes handsome by a few well selected ornaments of this class.

For oval ones, an oval, or, rather, elliptic chuck, is, of course, necessary, and few amateurs are lucky enough to have one of these. An ellipse can, however, be marked and cut out with a fret saw, and finished with a half round file, succeeded by the finest glass cloth or paper until fit to receive the paint or gilding after a ground has been put on, to prevent the colour from sinking into the grain, which is end on inside the ellipse or circle, and, therefore, difficult to get to a smooth and even face. Fig. 12 shows one method of drawing

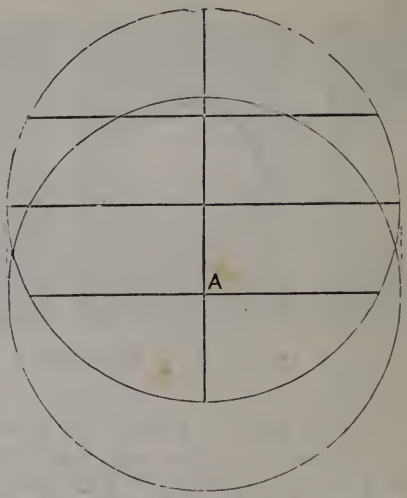

Fig. 12. A Method of Drawing an Ellipse.

such an ellipse—not, indeed, a mathematically correct one, but sufficiently near for the purpose. Fig. 13 is another, and Fig. 14 a third, and I think by far the best of the three. In the first of these the circles touch each other's diameters. In the second a circle is drawn, and a diameter, which is divided into three equal parts, and lines are drawn perpendicular to the diameter through these points.

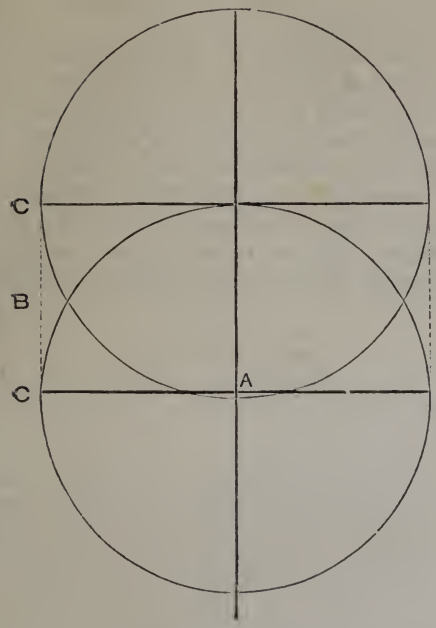

Fig. 13. A Method of Drawing an Ellipse.

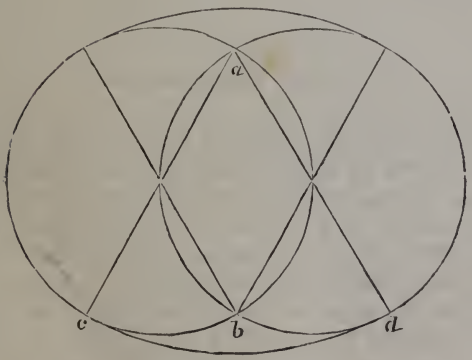

Fig. 14. Quasi Ellipse by means of Compasses.

The centre of the second circle is at A, where the third of these lines crosses the diameter.

The third method of drawing an ellipse completely by the compasses without having, as in the above, to put in the finishing stroke by hand, is for that reason an improvement upon the others, and gives a very good result. Draw two circles, as shown at Fig. 14, the circumference of each passing through the centre of the other. From *a* and *b*, where the circles cut each other, draw diameters. Then, taking *a* and *b* as centres, draw, with distance *c* and *d*, the curve required to complete the figure, which curve will be found to carry on, as if in one line, the smaller curves of the fundamental circles. This is an

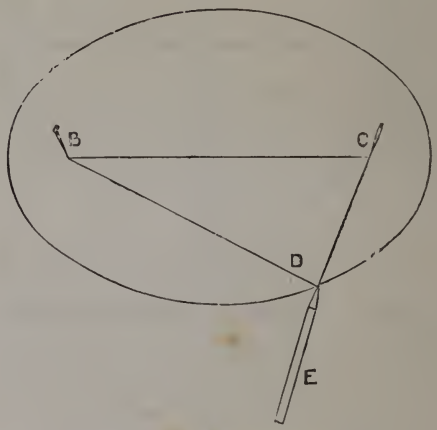

Fig. 15. Ellipse Drawing.

easy way of working with compasses alone, and the resulting figure, whether we call it an ellipse or no, will be of very good proportions for the purpose intended. The line, moreover, is bold enough to be easily followed by a fret saw or even fine keyhole saw.

Fig. 15 shows another and a perfectly correct method of describing an ellipse of any desired size and proportion. Pins or nails, B C, are driven into the paper or board at the foci of the ellipse, and a double string slipped over them. A pencil's point is then placed so as to draw the string tight, and is carried round in the loop as shown in the sketch. The smaller the loop the longer will the ellipse be in proportion to its size. An ellipse so drawn is mathematically

correct, which the others are not, but Fig. 15 will be seen at once to be very nearly so. Whichever plan is adopted, the fret saw is to be guided so as just to leave the line visible after the cut has been made, and then a half round file will finish it neatly. If the edge is to be bevelled, two lines are required to mark the position of it, and that inside the inner line is to be cut out first. The bevel is then to be worked with a rasp and file alone, or partly with a knife and then with a file, taking the utmost care to keep it true. The inner line will, of course, be obliterated, and, therefore, this should be carefully cut first, and, its edge once formed, not in the least cut into in forming the bevel. When the hole is circular and a lathe is used, the bevel can be made and moulded or beaded while the work is on the chuck, if the cut is so managed that the final stroke of the tool which severs the inside disc is not made till the bead is finished. Then, the moment the piece falls off the chuck, the bevel will be formed complete. The oval chuck, if at hand, will, of course, enable an ellipse shaped bevel to be worked in precisely the same manner.

In Fig. 16 I have introduced a modification of the plain oval frame, which, with an oval chuck, will present little difficulty, but which can also be managed by the fretsaw and eccentric chuck, or even by one of the expanding centre bits, the round holes being capable of being thus cut out. This frame, if not done with the elliptic chuck, is a specimen of carving so far as its outer part and general features are concerned, and is really worth some trouble, as the effect when finished is good. It is intended to hold miniatures or medallion photos. Half-inch sycamore will look well left white, but the flat part can be ebonised, which will throw up the outside moulding and form a good ground for the photos. By one or other of the processes already described, mark out the ellipses, both the outer and inner ones being well defined with a pointed blacklead pencil. The wood is to be first planed level and smooth. The circles had better be marked at this stage. Now saw out the piece, only just keeping clear of the outline, yet leaving it distinctly marked upon the wood. The inside of the rim as well as both sides of the inner beading should now be gone round with a carver's V tool or screver, cutting out very carefully a V-shaped groove true to line. But before beginning this it will be found advantageous to glue the piece down upon a block of ash or other wood about an inch thick, by which it can be gripped in a vice or held down to the bench by a carver's screw; for it is essential to success that it be held very steadily.

A carver's screw is simply a double screw or bolt with a screw at each end; one is pointed like that of a taper screw chuck, the

other is made to take a washer and bow nut similar to those used to hold lathe rests or poppits. A hole is made in the work bench to receive this bolt, and thus by its means work can be securely held, while at the same time, by slightly loosening the hand nut, it can be turned round and shifted horizontally into any desired position. This is an inexpensive appliance of extensive use, and should be in every amateur workshop. After having cut out the V grooves, which

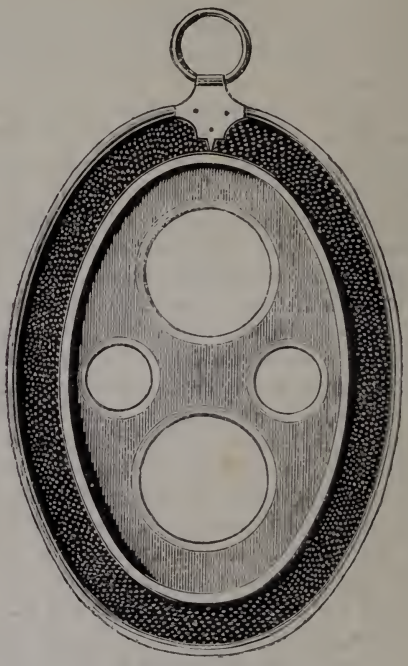

Fig. 16. Medallion Frame.

should be very sharply and decisively, but not deeply, cut, take what is called a matting punch star, or chequer punch, which can be had at any good tool shop, and, using a hammer, strike it into the wood, first going all down near the V groove on one side, but constantly twirling the punch round so as to vary the direction of the mat or chequer. Then do the same all along the other V groove, so as to get the edges neatly defined, and, lastly, carry the process over the

rest of the space between the two beads. This will throw up the beads by depressing the wood between them, and, in addition, this chequered or diapered surface will throw up in relief the beading which has eventually to be either rounded and papered smooth, or, if preferred, left flat ; but, in the latter case, it should be left wider, and not merely as a narrow bead. Success in this matted work depends on striking the punch equally hard each time and turning it about after each stroke. The diapered part will then be equally deep all over. It should not look battered and broken, but merely as a sunk pattern of even grain.

The inside, shaded with lines, if similarly worked, which may be the case as it will have a good effect whether blacked subsequently or left the natural colour of the wood, should be diapered with a fine punch or one of a different pattern. I prefer this flat part worked with much finer stars or indentations, and given altogether a more flat even look than the band between the outside beadings. This part may, indeed, be left quite smooth, but, if so, it should be somewhat lowered, and this is not easy to manage neatly, as it has to be worked with a chisel after running a V tool round the smaller beads surrounding the round holes. There is no easier way to lower a surface where carving is partially employed than to use the matting punch. This same frame, after it has been worked thus, may have any part gilt with Judson's Gold Paint. If this is to be done, ebony stain all over the inside flat, and gild the small beadings and the whole width of the outer frame—*i.e.*, the two beads and diapered interval between them. The beads can be then rubbed bright by means of a gilder's agate burnisher, leaving the dull gold diaper between. Properly speaking, gilding should, however, be laid upon a well prepared ground to prevent it from sinking into the wood, such as a coating of size and plaster of Paris, or "filling," as it is called, which will destroy the absorbent nature of the wood. Judson's Gold Paint will, however, stand well without this if painted on tolerably thickly. It is a very valuable addition indeed to the stock of the amateur frame maker.

CHAPTER IV.

OXFORD FRAMES.

CUTTING REBATES—CUTTING OUT AND MARKING THE STRIPS—CHAMFERING THE BARS—FITTING FRAME TOGETHER—EFFECTIVE DECORATIONS.

MITRED frames are very inexpensive, and comparatively easy to make, and so well suited to amateurs, who will find in them a capital field for the exercise of their skill and taste. An Oxford frame is, however, of more complicated construction, and requires more time than an ordinary mitred frame, and also needs a tool, which the latter does not, to cut the rebate.

For a frame about 12in. by 10in., or 14in. by 18in., four strips are necessary, 1in. thick and ½in. wide. They will be edge up, and a great

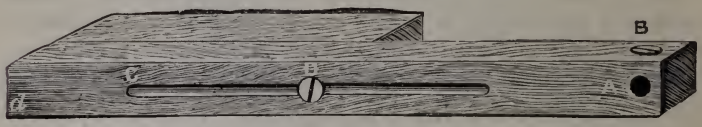

FIG. 17. CARPENTER'S GAUGE.

part even of this will be bevelled off, so as to make the frame look light; for if made thicker, it is sure to look clumsy and heavy. The strips having to be cut from a board of the necessary thickness, the latter will have to be marked by setting a carpenter's gauge to the width, in this case, a shade over ½in., to allow for planing. The carpenter's gauge may be modified by constructing it like Fig. 17, which shows the gauge on a larger scale. Fig. 18 illustrates the same in actual use. It is made of two pieces of hard wood, being a plain squared block, and (A) a longer

piece of similar stuff, with a slot in it to take the screw, upon which it slides stiffly. At the end is a round hole for a pencil or for a cutter, and this is held in place by a small clamping screw, seen at B. A cutting gauge would, of course, have an adjustable blade in lieu of the marking pencil or point, and such a gauge is almost indispensable for constructing these Oxford frames, although I have now and then cut the rebate with a chisel.

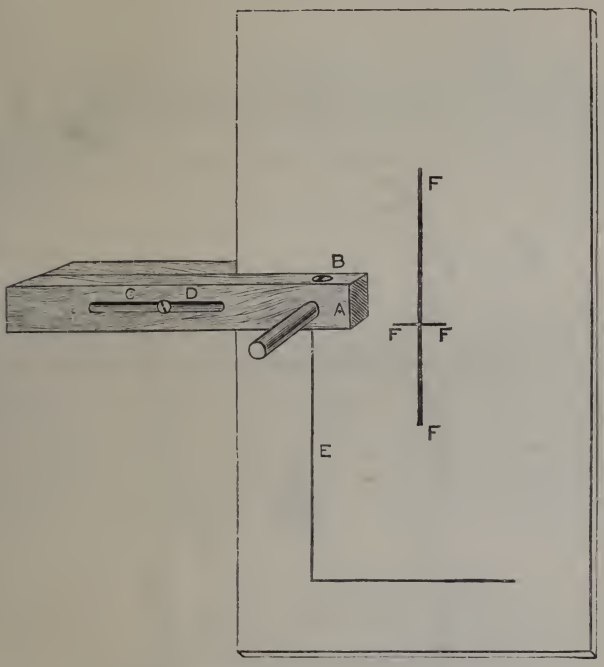

Fig. 18. Marking and Cutting Gauge.

Supposing the strips to be cut out and accurately planed to the length required, two for the sides, and the other two for the top and bottom, the next thing to do is to mark and cut the notches by which they are fitted together. Fig. 19 (A and B) show this, the cuts being sawn half through each with a tenon saw and the intervening bit removed with a chisel. As the projecting ends, A, B, C, D (Fig. 20) of the long side strips will usually have to be of equal length, they should be marked together, laying the square across them both, as seen at C of

Fig. 20, to insure absolute correctness, both as to the position and squareness of the notches. The short pieces are also to be similarly marked side by side. Some makers keep the outside pieces, A, B, C, D

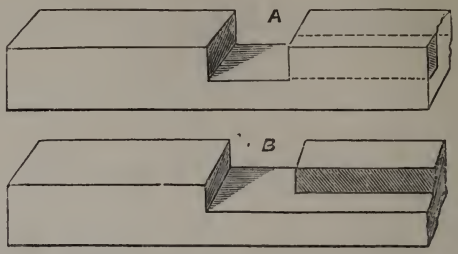

Fig. 19. Cutting the Rebate.

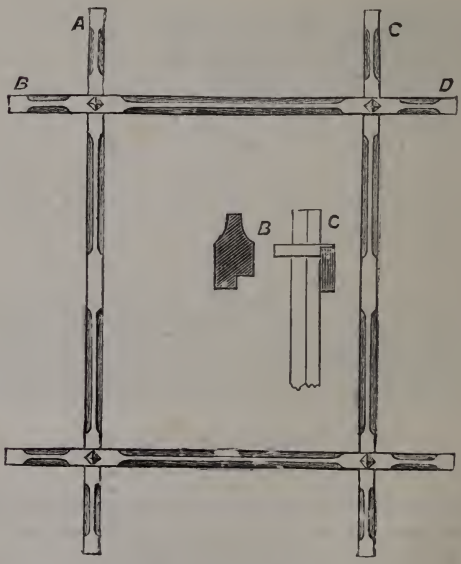

Fig. 20. Oxford Frame.

(Fig. 20), all alike as to length, and some make the projecting parts of the sides a little longer. This does not much matter, and either looks satisfactory, but if there is unevenness of length nothing can look worse

—*i.e.*, if one of the long pieces projects more than the other, or if one side of the frame shows more of such projection than the other.

Some little assistance in cutting and marking the strips may be obtained by using a sawing and marking block like Fig. 21. A piece of squared wood, A, is screwed to a board, as in making the mitre block already described, and a saw cut is made at right angles across it to such a depth only as the notches will be required in the strips. This insures

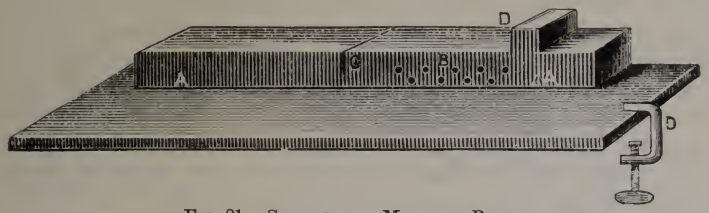

Fig. 21. Sawing and Marking Block.

their being all cut to the same depth. The piece, A, should, therefore, be just as deep as the strips to be sawn, say, 1in.; D is a clamp by which to affix the whole to the bench. The holes, B, are for stops or pins against which to abut the ends of the strips, so that the saw cut in each may be at exactly the same distance from the end. By shifting the pins, this distance can be varied to suit frames of various sizes; D will form also a planing stop useful for the pieces to abut against for planing or chiselling the chamfers. The clamp can be bought at almost any ironmonger's, and

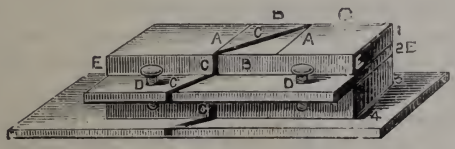

Fig. 22. Mitre Block.

at all tool shops, and will be often handy for many other purposes. These are now sold, some cast iron ones made in America and imported by Churchill of Finsbury, and others, at 1s. or 1s. 6d. each, with a range from about 4in.

The drawing, Fig. 22, represents a mitre block of a somewhat different construction to those already given, and appears to have the advantage when desired of holding the strips while they are being sawn. The

method is also shown of originating or setting out correctly the line in the saw kerf, which is to be made to guide the tenon saw. For the latter purpose two fine pencil lines (A A) are drawn on the block by means of the square at the same distance apart as the width of the block of wood, thus forming a true square. The diagonal C is the line for the saw kerf for mitred joints. In this block a projecting tongue of metal or hard wood (preferably the latter), to save the saw teeth, is made by inserting a piece between the two halves of the block, or in a deep groove, so as to hold it quite firmly, and this carries two clamping screws, as shown. When it is not considered necessary to hold the strips by these, the work can be laid on the top of the projecting shelf, and the saw used as before; but, if considered desirable, the strips can be laid on the lower board and screwed fast. This mitring block, however, would be more difficult to make, and the advantage over the simpler form is not very great.

In cutting out the notches by which the strips are to be halved together, always have them rather a tight fit, so as to form a very close neat joint, and do not undercut it in the least. If too tight, however, the pieces will be certain to break off when fitted and driven up close. The block, Fig. 21, or one of the others for sawing at right angles, will insure the truth of cut at these corners by preventing undercutting, or the contrary. When put together the pieces should be quite flush on both sides, which will only be the case if the notch is made in each piece to exactly half the thickness of the stuff. Now all this, upon which in a great measure the excellence of the work depends, is evidently more difficult than sawing and fitting together mitred work; but, on the other hand, when in place, the several pieces are securely retained while the glue is drying, without any need of clamping or tying them.

Having notched the frame together, the position of the rebate to take the picture, glass, and back will be seen. We cannot get out the mitre by the ordinary plane, because it has to end abruptly at the corners, and is not carried on to the ends of the projecting pieces at the angles. It might be so worked if it were not that it would cause a notch at their extremities. It must, therefore, end at the inside angles of the frame where the strips fit together. The best way to make this rebate is to use a cutting gauge, a cutter taking the place of the pencil or point used in a marking gauge. Fig. 19 will serve to explain this part of the work. The dotted line shows the course of the gauge, and the shaded end denotes the piece that has to be wholly removed. The gauge will, like a knife, cut cleanly two lines, as dotted, and a chisel will remove the stuff; or a broader edged gauge, made to work like a narrow plane, may take the place of the chisel, but a knife-edged one must first score the work to insure a straight, smooth, and even cut. You can, indeed, rule the lines

and cut with a chisel alone, or with a penknife, to mark and partly cut the boundary lines; but it is slow work, and a gauge is easy to use and easy to make. If the frame is very light I should be inclined to mark out the notches by which to halve it together, and then mark and cut the rebate before sawing the notches, as these so weaken it that it may get broken in cutting the rebate. This sort of thing often occurs in carpentry, the work which would be naturally done last being done first. Such are mere questions of expediency. In any case it is well to consider well, before commencing to work, what will be likely to prove the best and most convenient order of proceeding. Amateurs generally neglect this in their hurry to get the work to look ship-shape. Fig. 19 B shows the rebate completely cut.

Fig. 23 shows one corner of an Oxford frame fitted together in order to display the usual mode of decorating by chamfering the bars to take off the otherwise heavy appearance of them. Upon success in this a great deal depends. There are mechanical appliances to fit to the lathe to expedite the performance of this part of the work, but there is not much real difficulty in dispensing with all contrivances and using gauge and chisel only, finishing, if necessary, with a half round file and fine sandpaper. First mark with a gauge the two longitudinal lines which are to form the boundary, and cross these at right angles to show exactly the position of the portions to be left square between the chamfers. Mark, also, in a similar way the depth of the chamfer, using the gauge set to the same depth as at first. Lay the strip upon the bench against the planing stop, or seize it in the jaws of a vice, properly protecting it from damage by wood, card, or paper packing. Now take a sharp chisel and a mallet, and, turning the bevel downwards, strike it in where the chamfer is to end, holding the chisel at the necessary angle, so as, if possible, to make one clean cut and finish it without needing a second. Do this at each end, and then, with gentle strokes, get out the rest nearly to line, so that at last you have but to pare off a thin slice to complete the job. The bevels may possibly, but ought not to, require a touch of file and paper; but the grand thing to aim at is a clean sharp edge and the nice subsidence into a straight line of the curved portions at the ends of the bevels. It is plain that a thick revolving cutter like a circular saw would, if properly arranged, do the work perfectly, and a small spokeshave finely set would, no doubt, answer; but, on the whole, the mallet and chisel, simple old-fashioned affairs as they are, answer perfectly in practised hands.

After the chamfers are finished it only remains to glue the frame together, clean off and polish (if desired), first putting on at the corners imitation nail heads, which are either of ebony or painted black. The

polish or varnish is quite a matter of taste, and for prints of religious subjects is, I think, well omitted. If, however, it is desired to polish or varnish, a coat of size or thin glue is to be brushed on and well worked into the pores with a stiff short-haired brush, and suffered to dry thoroughly. The surface is then rubbed down with glass paper, and the varnish—oak varnish—applied, and, if found necessary, repeated when

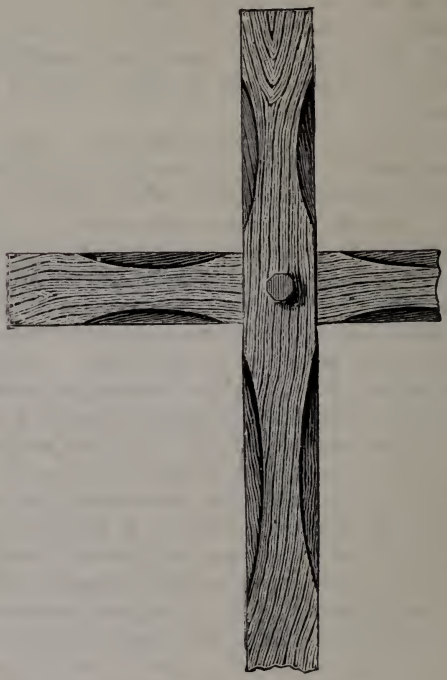

Fig. 23. Corners of Frame, showing Chamfer.

dry. For my own part, I think a special charm attaches to unpolished oak, and at most a little beeswax rubbed on and polished by friction with a bit of flannel is all that seems necessary. Of course, Oxford frames can be gilded or ebonised, or otherwise treated to suit all tastes. Ebonised bevels, or a strip of gilding just round the sight line of the picture, will improve these frames when used for water-colours, and the wholly gilt ones have a handsome appearance in a drawing room. But,

although of similar pattern, these can hardly be called Oxford frames, as the name originated in this style of plain oak frame for mounting sacred subjects, and to such they were at first confined. To mount in them such subjects as sporting prints (although one sometimes meets with them so framed) is wholly out of taste.

The decoration of an Oxford frame properly so called should un-

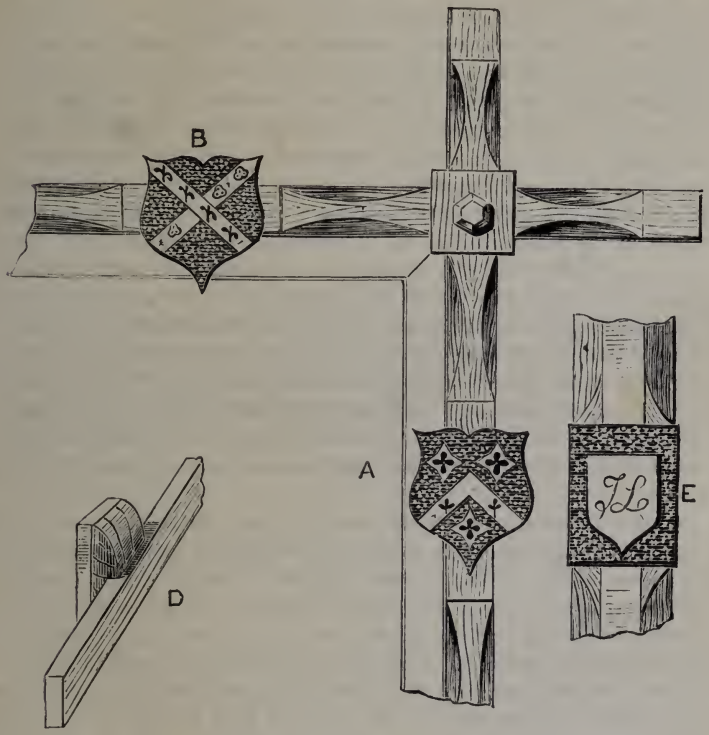

Fig. 24. Corner of Oxford Frame with Shield Decorations.

doubtedly be such as in no degree to alter its character or impair the severity of the outline. Hence there is an objection to rounding the sides instead of forming them with sharply defined bevelled edges. The simplest additions are, perhaps, shields with emblematic monograms or devices, or with coats of arms if the subject to be framed is not of a sacred character (see Fig. 24, A B). This is a frame with an inside

mat of plain gilding. The gilding is often picked out with vermillion or other bright colour upon the shields, but in this, again, the admissibility of colour upon oak is, I think, questionable. The general character of furniture or fittings, or frames of oak, should, I think, be a classical severity of outline and massive, but not heavy, design.

Carving may be of any degree of richness and beauty, but any approach to what we know as mere prettiness, whether in form or colour, seems out of place and out of harmony. The wholly gilt frame is different: here we have work purposely decorated so as to conceal the material of which it is made, and intended of itself to serve as a decoration of the room in which it is hung, and, therefore, the combination of colour with gilding is perfectly in accordance with the general object and design. In respect to the oak frame, diaper or work done as described with a matting punch, to throw up the shields or raised parts of the work, will look very well. I have so pictured the shields themselves on the frame at Fig. 24. These shields, although they ought to be cut in the solid, will seldom be so in reality, but the piece roughly shaped will be glued on and then undercut, so as to become united with the wood underneath it, and the plain surface afterwards finished. A mere thin shield, evidently glued on, will never look well. If the shield is let in, as seen at D, and the back rounded off and undercut properly, it will look as if made from the solid material of the frame. A comparison of one so made with one having flat shields stuck on would at once show the comparatively poor and mean appearance of the latter.

A shield is often more effective when it forms a raised portion of the square or parallelogram left between the chamfered parts of the frame, as shown in Fig. 24, E. In such position it may be glued on without deteriorating from the effect, but in this case it does not overlap, and it would be impossible to say whether or not it was cut in one piece with the square part under it. There is here, therefore, no need to undercut it, and it should stand up $\frac{1}{16}$in. or more, according to the size of frame upon which it is formed. If cut from the solid it becomes necessary to saw out the stuff as before in strips, but to make them wider and thicker, and then again to saw these down between the several shields or square parts—or rather, to work them with saw and mallet and chisel. This is tedious work, and if, therefore, we can save it, it is well to do so. Workmen usually employ the quickest method.

The question has often been asked by amateurs whether it is not possible by some rotating cutter or other to do the chamfering work, and save time and labour that must otherwise be expended upon it. The real question is whether it is worth while to provide such apparatus

when, perhaps, a dozen frames at most will be made. For a factory it would be vastly different, and some such apparatus might be used with manifest advantage. We have, however, now so many amateurs in possession of lathes who like to make themselves universal carpenters and joiners that I here give, for their benefit, the principles of construction which will guide them, and two forms of cutter for this kind of work.

If a section of the required moulding is sketched, as in Fig. 25, where is delineated that of the Oxford frame, it will be evident that we can carry on the lines until we get an outline of the edge of a revolving cutter, or pair of cutters, which only need to be mounted upon a spindle, and set in rapid revolution, while the strip placed on a platform is slowly carried forward underneath, either by hand or by mechanical agency. If the teeth round the cutters are kept sharp, and sufficient speed given, the result will be a smooth moulding, in shape the counterpart of their edges. By these simple means the long strips of moulding, hand railing, grooved and rebated stuff, required by the trade, are produced, and the planed flooring and other flat boards likewise depend on the action of similar rotatory cutters. But for work like the present cylindrical cutters are too costly, owing to the difficulty of forming and sharpening their teeth, and, therefore, instead of these, flat pieces of steel, of suitable width, are mounted in a slot in a bar, the cutting edge shaped like the required moulding. These, if driven at a very high speed, are found to answer perfectly. B, C, D, of this Fig. 25 represent a single flat cutter of this kind, clamped by a single screw in a slot in the bar C. The wood must be arranged to slide on a flat bed, and to advance very slowly, while the speed of the cutter cannot be too high. If the material is moved forward too fast, the rotation of the cutter will be stopped at once, especially if it is set far out to cut a deep chamfer, as shown.

I have illustrated this process to explain the nature of such apparatus, rather than to recommend it for general use in Oxford frame making. The latter needs but a little care and patience, and can be well and speedily manufactured by hand tools alone. Small revolving cutters are nevertheless of great use, especially in moulding and shaping metals, and being small, and consequently not projecting much from the bar in which they are fixed, they do not vibrate and serrate the material, which these blades used on wood are apt to do. In fact, machine-made mouldings frequently show the jar and vibration to which the cutter was subject, and require to be rectified by a few strokes of an ordinary moulding plane, to give them a satisfactory finish. The smaller the cutter the less the vibration, and (for wood) the higher its speed the

cleaner will be the cut. The main secret in hand tool-work is to have the chisels and planes as keen as razors, not only free from the slightest notch, but also intensely sharp, because this will preclude the necessity

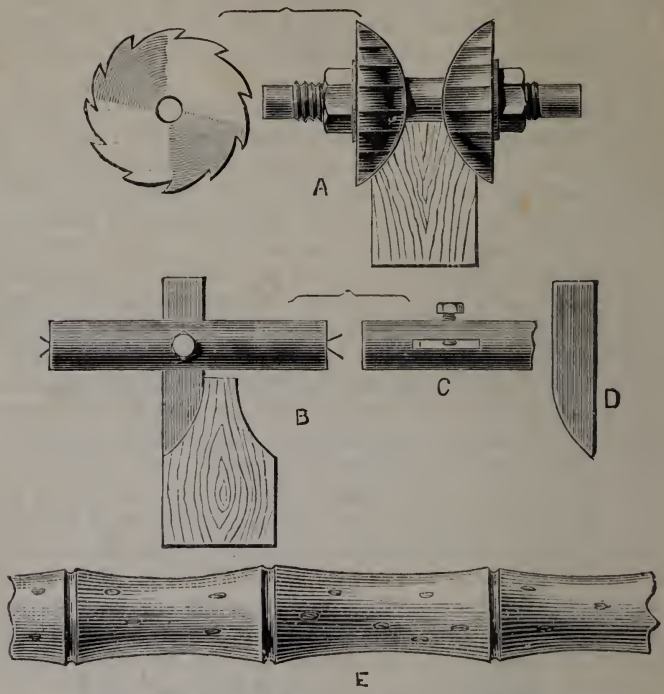

Fig. 25. Forming Bevels with Rotating Cutters.

of using the amateur's friend, glass paper, which, although it may impart a dead smooth surface to the work, is pretty certain to round off all angles, and thus spoil the effect of an otherwise well defined moulding. It cannot be wholly dispensed with, but wherever not absolutely necessary, it should be carefully avoided.

CHAPTER V.

BAMBOO OR JAPANESE WORK FRAMES.

Turning Wood to Imitate Bamboo—Fitting Corners of Japanese Frames—Making Double Bamboo Frame with Gold Mat—Effective Decoration.

We have now to pass on to frames of a very similar kind so far as construction is concerned, but which are formed partly by the lathe, and are called bamboo frames or Japanese work, although made now in vast numbers at exactly such distance from Japan as London happens to be. Bamboo work proper is, of course, to be had in almost any quantity and at a very cheap rate, but in the country some substitute must be found, and that substitute is generally ash or deal stained to a pale yellow tint and variegated with dashes and spots of darker colour. To make the imitation perfect the lathe is called into requisition in order to round the pieces and imitate the joints always present at intervals upon the bamboo. The appearance of a piece of wood worked to the proper form is shown in Fig. 26, which, I suppose, Mr. Ruskin would call idealised bamboo, but it is sufficiently imitative of the real thing to pass muster in furniture, whether for chair or table legs, the framing of screens, or pictures. Each section is marked by a small groove cut with a gouge, and each intermediate space is then hollowed somewhat, as shown, and turned smooth with gouge and chisel. Glass cloth may be used here, because it is not necesary to maintain sharp edges, which, indeed, are not present in the natural plant. This same pattern is often used, and the small hollows gilded, while the intermediate parts are ebonised, and for this work nothing will answer so well as Stephen's black stain and Judson's gold paint. But when so coloured, there of course remains no semblance of bamboo ; the work merely becomes of an ornamental character, and falls under the category of ordinary

furniture. It is, nevertheless, of a neat character, and for some subjects suitable for use as a picture frame.

The mode of fitting together the corners of frames of a Japanese character is similar to that described for Oxford frames; but the rebate is not so easy to cut, and, owing to the alternate ridges and hollows, it is also less easy to mark a line upon the wood. It can nevertheless be done by

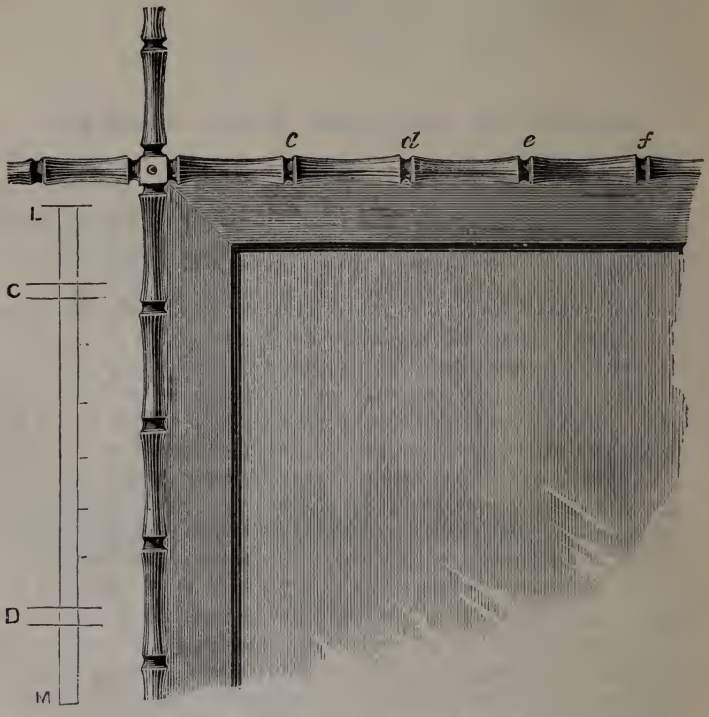

FIG. 26. BAMBOO FRAME AND MAT.

a little contrivance. One way, and the simplest, is to work as a machinist does with a scribing block. Lay the turned strip on a flat surface, and secure it by driving a nail at each end, so that it will not slip nor roll over in the least. Take a block of wood (Fig. 27, B), and bore a hole through it at the necessary height to receive a pencil, or fasten the pencil by two wire staples on the top of such block; or use a real scribing block (but the pencil is better on white wood). All you have

now to do is to slide this block along the bench, keeping the pencil in contact with the work, and it will go into the hollows, mount the ridges, and strike a straight line as it traverses along. You can even make your hand do as well by holding the pencil stiffly, closing the fist and sliding it steadily along; and the hand, being elastic and yielding, will often do the work better, without danger of breaking the point of the pencil. Having thus drawn one of the lines, loosen the nails which hold the work, and roll it over until the scriber will be at the right place for the other line; then refix it, and repeat the process. You can now, with a fine brass-backed saw and chisel, cut out the rebate, working

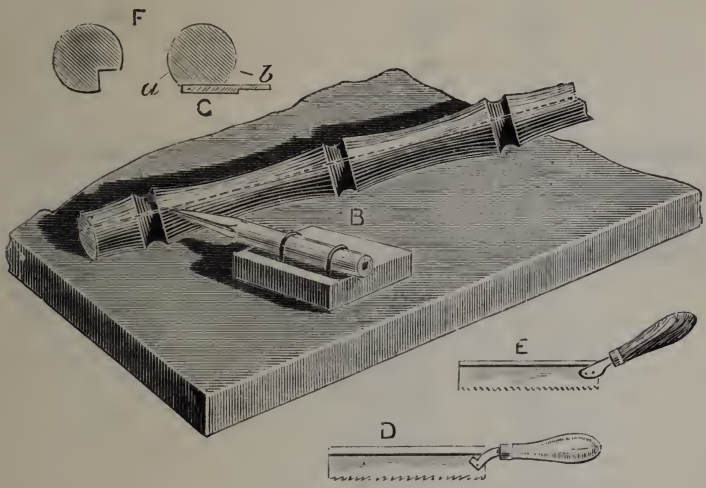

Fig. 27. Marking Rebate.

carefully, and guarding against any accidental chipping or splitting of the wood.

The ordinary tenon saw, or even mitre saw, is too coarse for very fine work like this; but you can get a smaller article at tool shops, similar to D, the saw being made with a tang like that of a chisel, which is fitted into a straight-turned handle. By heating and bending this rather more out of the horizontal line, as in E, the hand will be kept well above the work, and a saw cut can be easily made along the marked line, and stopped at the point where the notch is made to halve the frame together. With the rebate thus cut, the section of any one of the pieces would be like F, only the rebate is not carried to the extremity. This

same kind of frame will look well made with a gilt mat; and in such case (as the rebate will be in the mat), the round bars need not be so cut out. Plane a flat, and glue on the mat after it has been cut and fitted together so that it will be like G. Observe that only enough is planed to enable the mat to take its bearing, so that on looking at the frame as it hangs this flat may not be observable. Here, again, the flat is not to go beyond the mat, because the projecting parts, *a* *b*, are to be kept round. Real bamboo work is not generally put together with nails, but pegs, and is bound with strips of cane, or portions of the ribs of

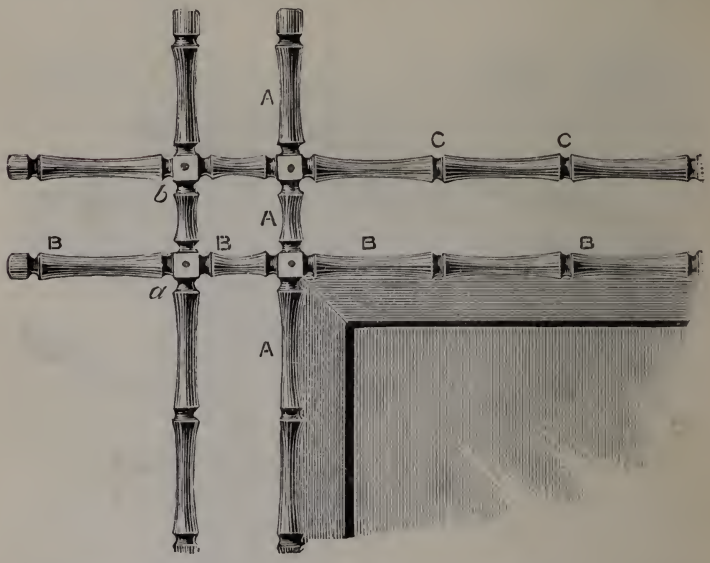

Fig. 28. Bamboo Double Frame and Gold Mat.

the leaves. This may be done in addition to the nails and glue, and, if the bands are very neat, they will act as an ornament. A frame like this ebonised, with gilding where the imitation joints are, and with a gilded mat inside, will look well in any drawing-room, and will suit prints or water colours.

A still handsomer frame is shown in the next figure (Fig. 28), the bamboo work being here made double, which has a very light and elegant appearance. The mat is here fitted within the inside frame only, but may be made to fill also the space between the two strips of bamboo

work. In such case I should plane a flat on both, and fix them to the mat with glue, aided with a few needle points. These are sold on purpose for this kind of work, and for fixing gilt moulding round the cornices of rooms, as also for many other purposes of similar character. But such a frame so fitted will need special care, or the mat will not be true with the outline of the bamboo work. Nor do I think that it will look as well with the mat so placed as with the bamboo work left open, as shown here. In constructing such a frame, make it as if a single one first, fitting A A and B B, the latter having been first rebated to hold the mat, and notched properly at *a b* before being put together. Then add the outer strips of bamboo work. This will be found far easier than working the double frame together. The inner simple frame when thus made will be securely held, each piece in its proper place, and the outer strips can be very easily fitted without fear of their getting displaced during the process of drying. The space between the outer and inner frames may be filled with any light work if desired. Fretwork may look well for this purpose, or mere turned bars standing across from frame to frame at intervals, but these should not be too numerous, say, one at each second joint of the bamboo work.

It will be noticed that just at the corner the crossing of the bars of this frame forms a square, the intervals between the joints of the bamboo being much shorter than they are in other parts. This is done purposely, as the effect is better when completed, and it is easy when the pieces are being turned in the lathe to make special arrangements for this. But let me warn my readers that they measure not from joint to joint —*i. e.*, not each bit—in setting out the work, but from notch to notch in the first place—that is, to the real joints, the half lapped parts by which the whole is fitted together. Thus, let L M (Fig. 26), represent one of the sawn strips to be subsequently rounded and shaped in the lathe. Begin by marking it with the two half-lap points, C D, just as if you intended it for an ordinary Oxford frame, and at this part leave the wood square if you like, to take, eventually, little ebony nail-heads, which are meant partly to relieve the frame and partly to appear as if real nails were holding it together. Then, a little way on each side, place the first of the turned joints, and divide the remaining part at pleasure; but do not have too many of these joints, as they look better when tolerably far apart. Always proceed thus in such matters, marking first the main divisions and leaving all minor details till afterwards. If you should chance to get some of the latter of unequal size, it will often be hardly noticeable; but if the main divisions are not true, the whole frame will be out of square and utterly spoilt. Hence I have directed the markings first of the half-lapped joints, and then, as a

secondary matter, the division of the remainder by the turned hollows, *c*, *d*, *e*, *f*.

The joints of these lighter frames need not be nailed, as glue properly used ought to be sufficient, and will be so if the fitting is accurate. Nails have a knack of going in a wrong direction and splitting the wood, and, in spite of all care, are not always to be depended on. But glue must be used judiciously, or it will be of no service. It must never be thicker than cream or fresh-run honey, must always be as hot as possible, and the wood to which it is to be applied must be also heated. If the glue, on being brushed on, is chilled, it will dry in thick clots, which actually force the joint open instead of holding it closely together. All that can be pressed out, moreover, in putting work together is thus to be got rid of, so as to leave the actual surfaces almost in contact, there being only a thin varnish of glue between them. Where glueing is extensively used the room devoted to the work is kept at a high temperature, and the parts to be united are also made hot; the result is that the work thus treated will only come apart by the actual tearing asunder of the fibres of the wood. Glue is, in fact, one of the most adhesive and powerful of cements, but it must be used as stated, and it is for want of these precautions that cheap work falls apart, and that so much of an amateur's joinery shares a similar fate.

CHAPTER VI.

CARVED AND FRETWORK FRAMES.

FASTENING OPEN WORK DECORATION TO FRAME—TOOLS NECESSARY FOR CARVING AND FRETWORK—FRETWORK DESIGNS—CUTTING OUT—CARVED AND FRETWORK DESIGNS.

OPEN work may be arranged all round the outside of a mitred frame, in the manner shown in Fig. 29. To fasten it, a rebate can be run round the frame, so as to bring both this and the plain part to a level surface; and if the frame is veneered and this outer work cut out of the solid of similar wood, ¼in. or ⅜in. thick, and the whole is worked up together and polished or varnished, a handsome and highly ornamental frame will result, which yet from simplicity of design will not so catch the eye as to withdraw attention from the picture. If, on the other hand, elaborate carving is introduced, which is worth close examination for its own intrinsic excellence, the attention must of necessity be divided between it and the painting. No mistake is more common than this. Carving should be so introduced as a means of decoration that the eye may be concentrated upon its beauties. A carved sideboard or mantel shelf, or cathedral stall, will illustrate my meaning. We are not here called upon to admire the thing itself, which is merely of value for its utility, and would be equally so if plain. We are, therefore, left free to devote our entire attention to the decoration—in this case the carved work. But a picture is itself an object whose value depends on its various excellencies and beauty, and we ought not to have our attention taken off it by an elaborately carved frame, and, indeed, the more beautiful the latter is the more is it out of place.

It is astonishing how public taste has varied in this simple matter of picture frames, but the general feeling is in favour of something handsome, yet free from florid ornamentation. As a frame necessarily presents a mass of gilding several inches wide, and proportionately deep, it

seems not quite satisfactory to have a perfectly plain surface, which would be monotonous where a number of pictures are together. Hence we find at least the corners decorated by compo ornaments, and generally the mouldings also stamped with a shallow pattern of some kind, just enough to relieve the flatness of surface, by causing lights and shadows ; and inside this, next to the picture, a broad mat without any such decoration, because this is in close contact with the borders of the painting. This is beyond doubt the best arrangement. Whether the moulding should be such as to recede from the picture and render it the more

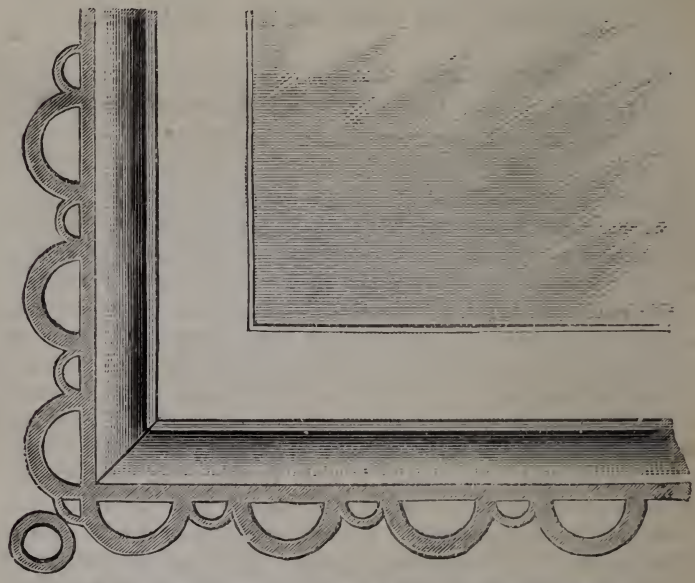

Fig. 29. Arrangement of Open Work round Mitred Frame.

prominent, or whether the frame should be so, is a matter yet undecided, and depends in a great measure on the subject of the picture. I have before me a fine life-size portrait by Sir Thomas Lawrence in its original frame, 3½in. in depth, without any plain mat, the background very dark, as was then usual ; and I think a mat or a receding moulding would not have so good an effect, besides giving the idea of a modernised old master. The deep frame and heavy moulding cause strong shadows, which are in unison with those of the picture, the figure being clothed, moreover, in black velvet.

Fretwork, combined with carving or otherwise, is of great use in frame-making when there are no such artistic objections to it as those already stated. A carved frame or a fretwork frame is perfectly allowable for prints, photographs, and architectural subjects; and the design of such may, if well considered, lend effect to the picture. It is by means of the fretsaw that most of the open work is done. It must be confessed, nevertheless, that fretwork is tedious, and requires indomitable patience and ceaseless care, as it may be easily fractured when perhaps a great deal of labour has been spent upon it. A false cut, too, may fatally mar an otherwise handsome and well executed pattern.

Nothing really worth doing is easy of accomplishment, and the picture-frame maker must bow to the requirements of the work which he voluntarily undertakes. If proper care is exercised success is certain, and success carries with it its own reward. Happily, a very small addition to the stock of tools will supply all that is necessary, the main additions being the saw frame (of wood or steel), with a dozen saws, a drill stock, and a couple of drills, two or three small files and a screw clamp, and what is called a horse to rest the wood upon during the operation of sawing; fine sandpaper and polishing material complete the outfit. The saw is, in fact, the only addition to the picture-frame tools already specified, as the drill, clamp, &c., are generally in stock in an amateur's workshop.

It may be expected that I should say a word about the sawing apparatus, because there are hand fretsaws and machines of various patterns, some of the latter being almost drawing-room machines. A great deal may be done with the handsaw, now usually made with a steel frame, but sometimes with a wooden one. The work is, of course, more tedious, and there is also to be encountered the difficulty of keeping the tool quite perpendicular to the surface of the wood, so as neither to undercut or bevel it. This difficulty is at once met and avoided in the machine, because the saw, rigidly stretched, oscillates in a direction perpendicular to the table upon which the wood is placed. The rapidity of the strokes of the saw is, of course, considerably greater, and as the machine is worked by the foot, both hands are at liberty to turn about the stuff in all directions. The process is, indeed, reversed, because with the handsaw the wood is held in a clamp and the saw made to follow the lines of the pattern, whereas in the other case it is the material which is shifted, and this often makes it difficult at first to substitute the machine for the handsaw after the workman has become used to the latter, and to move a tolerably large bit of work in all directions upon the table is not theoretically so easy as to turn about a thin saw, with a blade like a bit of flattened wire. Practically, however, the foot machine proves so rapid

and so much more manageable that it is generally preferred. My advice would be to commence with a hand fretsaw until it is ascertained whether the work is quite congenial to the taste, for I have known a really nice machine to be bought, used, perhaps, a dozen times, and then laid aside, patience and perseverance not being forthcoming to the degree requisite to insure success. The handsaws cost from 3s. 6d. to 8s. 6d., and there are some even cheaper, but it is useless to purchase one with too small a frame, as it so terribly limits the size of work.

There is, next, a pretty little handworked machine at 12s. 6d., by the Britannia Company, of Colchester, which is rapid in work and clamps to any table. One hand is alone at liberty, however, as the wheel has to be turned with the other. I have one of these; but the saw, being held by one end only, is scarcely found stiff enough, although it is supported at the back by a little leather disc, against which it works as it goes up and down. It is, nevertheless, the neatest and handiest portable fret machine that I have met with. Next come the three-legged ones at 17s. 6d., made by several firms, both English and American, and in these the saw, held by both ends, is tightly strained. Others are made to fit upon the lathe, so as to render the lathe flywheel available as the driver; while in others the machine saw for the foot is the foundation, and to this is clamped or cast a small lathe bed, with miniature poppets and hand rest.

I have one fault to find with all fret-sawing machines: The saw table, which is generally of a circular form, is not nearly large enough. Admitting, as the actual arms of the saw may do, work of 18in. and upwards, the saw table upon which it is to rest is often not 6in. in diameter. The greater part of the work, consequently, overhangs it, and as this gradually gets weaker as the cutting goes on, it has no efficient support, and is very apt to get broken. Besides this, it is a great nuisance to have to hold work with the hands when only a few inches of it rest on the saw table, and it is difficult to keep it level upon the latter. Far better is it to contrive a saw machine with table as large as the largest work that can be got under the arms of the saw, nor could I ever see any reason for having a smaller one. In fact, for comfort, I would have a table allowing my elbows as well as the work a resting place, and this would add considerably to the steady movement of it under the saw. I would advise no one to buy a combination tool. If a lathe is wanted, get one; if a sawing machine, buy a sawing machine, which then need not be contracted in size or so modified in detail as to spoil it for its own proper work.

Fretwork designs are now sold (see Churchill's list, of Wilson-street, Finsbury) so exquisite as to render it quite superfluous to attempt such

productions. Some American patterns are like lace work—difficult, of course, to cut in proportion to their elaboration, but when cut, and well cut, really ornamental, and fit for any drawing room in the kingdom. Others are published by various tool-shops, but I have seen none so beautiful as these, which are, I believe, imported from America. They are, moreover, of all shapes and for all purposes—card trays, pipe racks, bookshelves, brackets, book trays, clock faces, picture frames, and every other conceivable requisite amenable to this style of decoration.

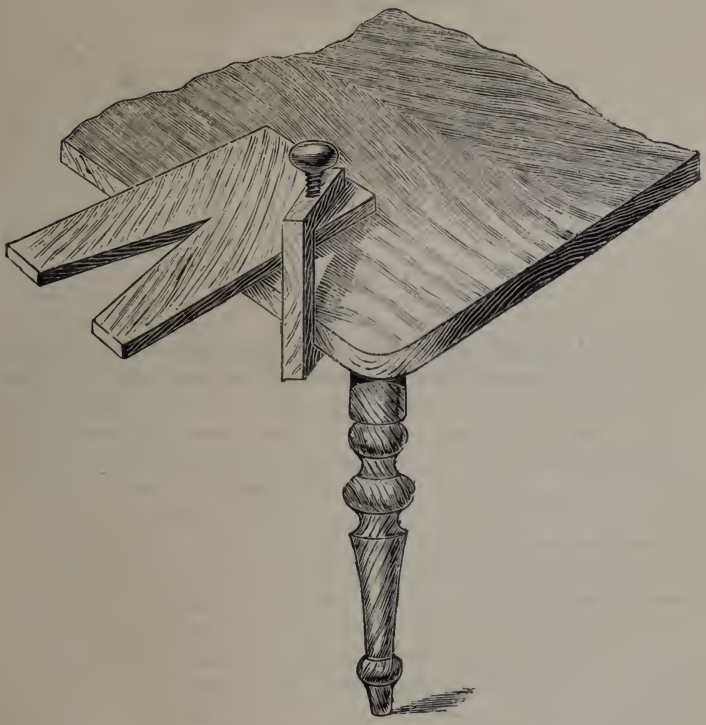

Fig. 30. Sawing Horse Clamped to Table.

To begin with hand sawing. The first thing is to secure the wood in a favourable position. It may be held upright, in the chaps of a carver's vice, or horizontally upon the horse, *i.e.*, a kind of forked table, here illustrated (Fig. 30). If held horizontally, the horse is clamped, so as to

overhang the table or bench, a small iron screw clamp being the best for the purpose. The wood is not clamped or fastened to this, but only laid upon it and held by the hand, so that its position may be varied, to accommodate it to the saw. The teeth of the saw must point towards the handle, which is always held underneath the work, so as to cut it by a downward pull. The saw frame (Fig. 31) is very high above the saw,

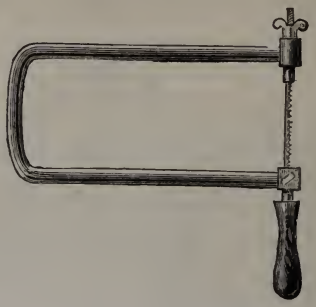

Fig. 31. Hand Fretsaw.

but narrow the other way, in order to clear a good-sized piece of wood, and the pattern must be well considered and measured before beginning to cut it, to see if it is possible to work the saw in the central portions without the frame coming in contact with the outside. But in most saw frames you can reverse the teeth of the blade to face the top of the frame, and also in some it is possible to set the blade so that the teeth shall point sideways; but generally it will be most convenient to face them downwards, as in other saws. There are many made with hard wood frames, which are very light in hand, and these also admit full-sized work. The saw handle, however, is not quite in a line with the saw blade, which to some persons renders it more difficult to use, and by far the greater number, if they employ a handsaw at all, use those with bright steel frames, now obtainable in almost any town in the kingdom at 5s. or 6s. There is, at any rate, one great luxury in all these fretsaws—namely, that they never require to be sharpened. They are so cheap that a blunted one may be cast aside at once; and, indeed, it is probable that a blade will be broken long before it has time to get blunt. The saws can be had with coarse or fine teeth, the former being preferable with any wood that will allow of quick cutting, but some hard woods need the fine-toothed saws.

It always seems a waste of time to use a fine saw when a coarse one will do the work, and I have seen some fine patterns cut with a common keyhole saw, ground a little narrower near the point. If the wood is to be polished, this had better be done before cutting, as polish rubbed or brushed on subsequently is sure to get into the narrow corners and to form thick lines upon all the edges of the stuff. All that can be done to polish after the pattern has been cut is to put on a little beeswax and turpentine, and to rub it well with a hard brush, clearing every thick daub with the brush as you go on. Even without beeswax a stiff brush will suffice for many hard woods, especially if planed quite smooth and rubbed with shavings before the pattern is cut. This will be recurred to presently.

In cutting out a pattern a good deal of judgment is needed as to where to begin, and, generally speaking, the inside should be done before the parts round the outer edges, which, if worked first, present a number of projections likely to catch in the clothes of the workman and get broken off. Where, however, the pattern is of that kind which forms a plain frame all round (as in fretwork intended to serve as a panel), it is not so important that the above order of work should be observed. The first thing to do is to select a design from one of the many published sheets, and the simpler it is the better for a beginner, as a complicated pattern, from the difficulties it presents, is likely to disgust a tyro before completion. Even the simplest may be of great beauty, and it will certainly demand care and patience for its accomplishment.

The wood ready planed may be had at most places where fret designs are sold, which is the case at most good tool shops, and advertisements of such can always be found in *The Bazaar*. The pattern may be transferred to the wood by copying, pricking, or tracing. The first is too tedious, and needs too much skill to be generally available. The second is much resorted to for simple patterns, and consists in pricking small holes all along the lines, and then, after securing the paper to the wood as closely as possible by a few needle points inserted in some of the holes, dusting powdered charcoal or dry whiting (according to the colour of the wood), by means of a bag of muslin, all over the pricked pattern. On carefully removing the paper the lines will appear dotted, and can be then followed with a pencil without much difficulty. Another plan is to place a bit of carbon paper on the wood, and, laying the pattern paper upon it, trace the lines with a stylus, which is about as good a plan as any. Or a tracing can be made of the design and pasted carefully down upon the work, as the destruction of this is often of no consequence, but it is, I

think, a pity to paste and use the purchased pattern, which should be carefully preserved, and will last a long time. Some do, nevertheless, make a point of using these to save the trouble of making a copy of them. The pattern, then, having been pasted to the wood or otherwise transferred to it, the actual work begins.

Suppose it to be a simple ivy-leaf spray, like Fig. 33, holes must be drilled where the crosses are, to allow the blade of the saw to be

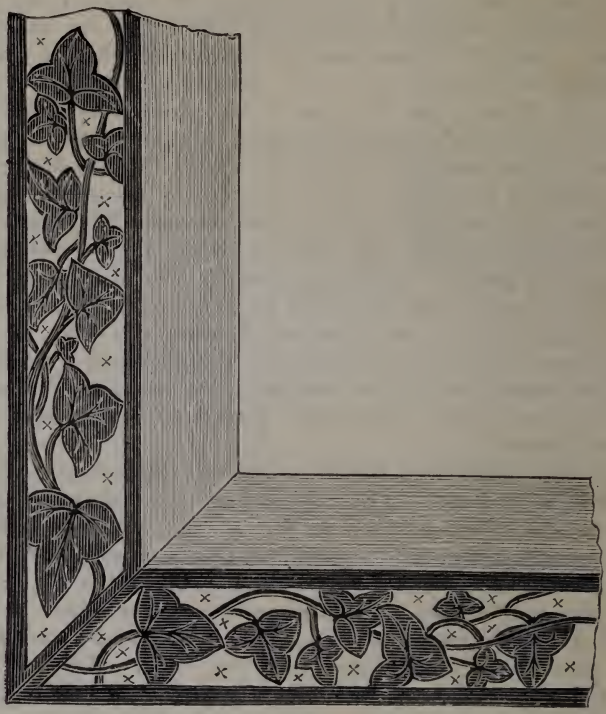

Fig. 33. Fretwork Frame.

inserted, and such holes must not be upon any of the lines, as these are to be kept quite even throughout the sawing. I have already explained the horse on which the wood is to be supported, the cut going on inside the forked part, so that the work is always supported on both sides, or, rather, three sides, just round where the saw is at work.

But many prefer to place the wood upright in the vice, of which a special form is sold having the jaws to close with a spring and to open by placing the foot on a small treadle. An ordinary vice, however, will do for an amateur, unless he has ingenuity enough to make a special one. The horse is so far the best that the wood is more efficiently supported, and it is better to get at once into the habit of using it. The saw, being loosened at one end, is passed through one of the drilled holes, and again screwed up until it rings on being touched, proving it to be tightly strained. The handle is downwards, and, as stated, the teeth also point in that direction. Cut by steady but quick strokes as nearly as possible upon the line, just leaving it visible upon the part that is to be left. When a corner is reached do not, if it is a sharp one, attempt to turn in it, but back the saw to the hole that was drilled, and begin cutting across, so as to end in the corner again, which will thus be quite sharp. Always keep the saw moving up and down while backing it along the cut already made, and, if it should stick fast through by the fine sawdust remaining in the cut, unfasten the saw at one end and draw it out of the work.

Even here it is plain that you must learn to cut from left to right and from right to left at pleasure, and also learn to turn about the work with one hand while sawing with the other. One great difficulty will certainly be met with which must be overcome—viz., the difficulty of keeping the saw blade always perpendicular to the surface of the wood, so as not to undercut or make the pattern look at all different on the under side. For a long time this will be found very difficult to accomplish with the hand tool, and it will generally be found that there is a best and worst side to the pattern after it has been cut. With a fretsaw, fitted to be worked by the foot, this difficulty disappears.

A design like that illustrated at Fig. 33, showing the corner of a picture-frame, will be a very good one to commence with, because it is so arranged as to be strong, and there are few details liable to get broken off in the process of cutting. The stem is lengthwise of the grain as far as possible, and most of the leaves are more or less supported by not being wholly cut free — either the tips or some part of the sides being left attached to the framework. It, of course, gives a lighter and better character to the work to detach leafage as much as possible, but as the least attachment will add much to the strength of the whole, it is as well to work in the way suggested till practice has made the operation of fret-sawing perfectly easy. For the same reason, this design is bounded on the outside as well as the inside by a bit of straight framework, instead of having a leaf here and there

carried freely outwards. The latter are very pretty if well arranged, but, unfortunately, seldom remain long unbroken.

The most durable are those cut out of sycamore, lime, and some few other woods, which are not only tough, but have comparatively little grain and are not liable to split across when sawn; then these white woods are also exceedingly elegant when neatly cut and finished, whether varnished or not. Holly cut and worked thus is almost as white as ivory. Unfortunately, in England both this and the box tree are rather scarce. Sycamore is more easy to obtain, and is a very nice white wood, of somewhat mottled appearance. This wood carves well, and is, consequently, in great demand. Of foreign woods it is easy to make a selection at any of the dealers' in London, and most of these advertise in *The Bazaar* and in the mechanical trades' papers, but it should be always remembered that handsomely grained wood having a distinct design upon its own surface is apt to interfere with and spoil the effect of the pattern sawn out of it, which patterns, therefore, generally look better when cut from some one of the plainer and more evenly grained woods.

Nothing can be prettier than perfectly white fretwork with a backing of black or bright red, or even grey; and I think the wood is better left unvarnished. There is, indeed, a white, hard, almost colourless, varnish sold for the purpose, intended to serve as a protection, but even this is quite as well omitted. Next to white wood, its direct opposite is the handsomest, and black ebony or cocus, or black wood, will beat all imitations of it. Great skill has, however, been attained in ebonising—*i.e.*, staining wood black; and where cost is an object, stained material must, of course, be used. It is also easier to cut, as the foreign stuff is most of it intensely close and hard in grain, and I should advise beginners to content themselves with some of the softer woods. Cigar boxes are often made to serve the purpose, and offer a cheap and good material for practice.

The greatest trouble in sawing out patterns arises from liability to breakage. In some elaborate designs, where small projections occur, of which a large number depend upon a narrow neck, that is often across the grain, there is great danger that this may be broken off in the process of sawing. Careful consideration of the work to be done will often save trouble in this respect, and I give here a few hints which may be of service. Suppose Fig. 34 to represent a border pattern, of which the light parts are to be cut away, with the grain of the wood running lengthwise, as it would be almost certain to do. It will be seen that there is in each larger pendant a cross-shaped piece to be cut out and in the intermediate ones a simple quatre-foil hole. A novice would probably

first cut out all the pendants as a bit of straightforward work, and then return to each and take out the crosses and holes. The safer plan would, however, be to cut out the latter first, and then the main design, because in the other case, especially with the smaller pendants, the narrow necks

Fig. 34. Mode of Cutting Fretwork Frame.

would probably break in cutting the interior work. Again, in Fig. 35, which is a very simple design for a frieze or border, the danger of breakage will be at the narrow necks, *a*, *b* ; and the safest plan would be to run the saw to the dotted lines, *c*, *d*, and then afterwards to cut out the

Fig. 35. Order of Cutting Fretwork for Frames.

circular pieces on each side of the neck. But in this pattern the saw might very well run straight ahead right round the pattern, as the neck will be supported by the adjacent wood till the final cut is made. There will, in fact, be no strain on any one of the necks until they are free. But you have here the matter of the sharp points of the several crosses

to consider, and it would not do to turn the saw on arrival at these points.

Suppose we start at *x*, making the hole there for the entrance of the saw. Cutting down the left-hand curve, round past *a* to *c*, you cannot turn at the spot, but should go on again towards *x*, taking on the way the right-hand side of the small pendant, and, cutting to *x*, the piece will drop out. Now go back to the point of the cross at *c*, keep to the arrow and dotted line to K, following the hollow till you come out at *d*. Start again at K, cut along the straight end of the cross, carry the cut to *e*, sweep on round and clear out that piece. You can now run up *e*, *c*, and to *g* and *a*, sweeping out that piece as before, or go on towards *g* and *f*, and back to *a*, and come out at *c*, turning in the corner—not sharply, but leaving a little bit to be subsequently removed. In this way the saw is continuously cutting straight ahead. Another way would be to start at *x*, and merely run the outside of the cross, taking its straight ends, round and up to *f*. Then come back and cut out each curve independently. But the first is the best order of work, because you go ahead and clear out as you go by running to the furthest side of the several curves, and working round them to the opposite point. To cut the small pendants, the better plan would be to run round, as dotted, taking the general sweep of the curve, but not going up to *a*, because it is as well not to thin the neck till the lower curves are each worked out. I should myself cut across towards *b*, round that first circle, and back again towards the small pendant, taking out the piece ; then finish the pendant below, and afterwards cut out at *a*.

The curved portions to be removed from the upper part of the crosses, including the small trefoils, may be cut after all the rest, because there will always remain the three connections with the bar above them, thereby insuring the safety of the part. If the central point above the trefoil were detached and the cross merely suspended from the narrow semicircular band, the latter would probably be broken in cutting out the wood just below it. In such case I should cut the latter before taking the saw round the exterior of the semicircle. It is the same with the small pendants. If the outline is first cut and then an attempt made to shape the ends, the small neck will break. The ends and deep notches are, therefore, to be formed first, and then the saw carried along the external line. This design is not intended for imitation, but merely to explain the order in which such work should be done, because it is most disappointing to break any part, and it is an accident which often disgusts people with the work. Another cause, however, of fracture is the sticking of the saw in the kerf, either from its being jambed by the fine sawdust and being pulled too forcibly in order to free it, or sometimes

from the cut not being at right angles to the surface of the wood. In such cases something is sure to break, and very often it is the saw, which is of less consequence than a fine bit of fretwork, possibly almost finished; but it often happens that the latter is sacrificed, and if a good deal of time and labour have been expended upon it, it is but too natural to throw it aside and lose heart. This accident is best avoided by taking care so to order the course of work that no part is left unduly weak until the last cut sets it free.

There is nothing really difficult in fretwork, unless the pattern is very intricate and of great delicacy; but to hurry is in all cases to insure failure. Even with the most practised hand the application of a small rasp or file will be necessary to correct the various curves, which are sure to have angles or "knees" here and there from turning the saw too sharply. Files are made and sold on purpose for such work, and must be purchased with the rest of the tools and appliances. These require as careful manipulation as the saws. Being more or less taper, they are liable to stick fast by being thrust too far forward, in which case a breakage is almost inevitable. During the process of filing, the part to be operated on is to be brought over the smallest part of the notch in the horse, or over the smaller notch, if (as generally happens) there are two such notches, and the work must be well steadied by the fingers of the left hand pressing it down upon the horse. Only a little bit is to be done at a time, and the whole work then gone over carefully wherever correction may seem to be necessary. It soon becomes tolerably easy to carry the saw blade accurately round a curve of easy sweep which approaches a straight line, but it is far less so when the curve is of less radius. It would appear natural, too, to cut a straight line more easily than a curved one, but it is not so, especially if the saw be very fine in tooth, and, as a general rule, a somewhat coarse saw is not only more rapid, but easier to guide than a fine one.

The beauty of fretwork consists in well and sharply defined design, every curve true and even, every straight line such throughout its entire length. Hence it is necessary to keep all edges sharp, as any rounding of them is partial obliteration. For this reason it is essential to use sand paper as sparingly as possible, and it is far better to do wholly without it. The best plan is to plane and polish the board before cutting it, but this cannot always be done. After French polishing, the wood will sometimes not take pencil lines, nor can paper be pasted on without spoiling it. It can be pasted on the other side, but the saw teeth will then point towards the finished surface, and are apt to cause ragged edges. Hence it is often necessary to finish the surface to some degree after cutting the pattern, and sand paper is then

inevitable. To avoid rounding edges by its use, it must be strained very tightly over a block of wood, which should be an inch thick and about 3in. square, to enable the hand to grasp and use it readily. With a block thus covered, it will be easy, by steady circular strokes, to take off all accidental roughness left by the saw, and to reduce the whole to one uniform level and smooth surface. This may be delicately sized and varnished, or polished, as already stated, by beeswax and a hard brush, or even with the ordinary French polish; but, as any fluid polish of a creamy consistence is apt to creep over the several sharp edges, and to leave them thick and blurred, the utmost care will be needed to insure success.

The *carbon* paper used to copy tracings will, however, enable you to get a black line even upon a polished surface, if dry, and this is the only mode of doing so. You must use tracing paper, then, with the lines just copied upon it from the original drawing, and, placing the carbon paper below it, gum or paste only the edges of the tracing paper to the board. You can strain it over and paste it just round the edge or underneath, so as not to attach it to the polished surface. Then go over the lines with an agate point, and the carbonised paper will leave a black line to work by. Of course, the papers are then removed altogether, as the design will be mapped out upon the wood itself. Some polishes seem to take the carbon better than others; but quite dry French polished surfaces are marked tolerably easily, and the line is not readily rubbed out, but will wash off. If fine, it is, of course, almost wholly obliterated by the saw.

Instead of paper, fine linen, made transparent for tracings, is sometimes used, as it is not liable to be torn by repeated passage over it of the agate tracing-point or stylus. This linen may be strained over and tightly secured under the polished board by drawing pins, and can be used many times. Patterns are cheap, but a nice one is worth preserving, and it is capital practice to trace such carefully for use. By alternating white paper with the carbonised, it is, moreover, easy to get two or more copies of the design at the same time, such as will, of course, be needed if the articles are to be made in pairs. Like all valuable work, tracing is tedious, but there will be no success achieved without patience, nor without giving undivided attention to the work in hand.

CHAPTER VII.

MINIATURE AND PHOTOGRAPH FRAMES.

Medallion Portrait Frames—Carving Fretwork—Carving Tools—Carving—Designing Patterns.

Photograph and other miniature frames afford plenty of scope for the display of good fretwork and carved designs. The pattern given at Fig. 36 is for a triple frame intended for medallion portraits, in which fretwork has to be aided by carving. Except for brackets, piano fronts, blotting-case covers, book trays, and such like, fretwork is confessedly a weak and poor decoration. A great reason for this is that no one part can overlap another, and hence arises a formality of outline not easy to conceal. The design illustrated is only a tolerably easy one to cut out, owing to the length of one or two of the stems; but it is less complicated than it may at first sight appear, and will repay the trouble expended upon it. The ivy has been fairly copied from Nature, and I would call attention to the great diversity in shape of the several leaves. An ivy leaf is, I suppose, normally three-lobed, but if a branch be examined it will be found to have some leaves thus shaped, others not divided at all into three, but of very irregular outline, and others, perhaps, more or less heart-shaped. Again, some are quite flat, others variously hollowed and curved.

Fretwork leaves of all kinds are generally conventionalised, both sides alike in outline, and all, of course, quite flat. Hence the sameness and uninteresting character which such leafage presents to the view. Another peculiarity of ivy is the straightness of the fine stems by which the leaves are attached, the only curve in most cases being close to the main stem. Some are curved, but the rule is straightness, like that of the large leaf at the bottom. The more curved ones are generally the shorter, by which the smaller leaves are attached. It is not, indeed, absolutely necessary to follow Nature accurately in this respect, but the

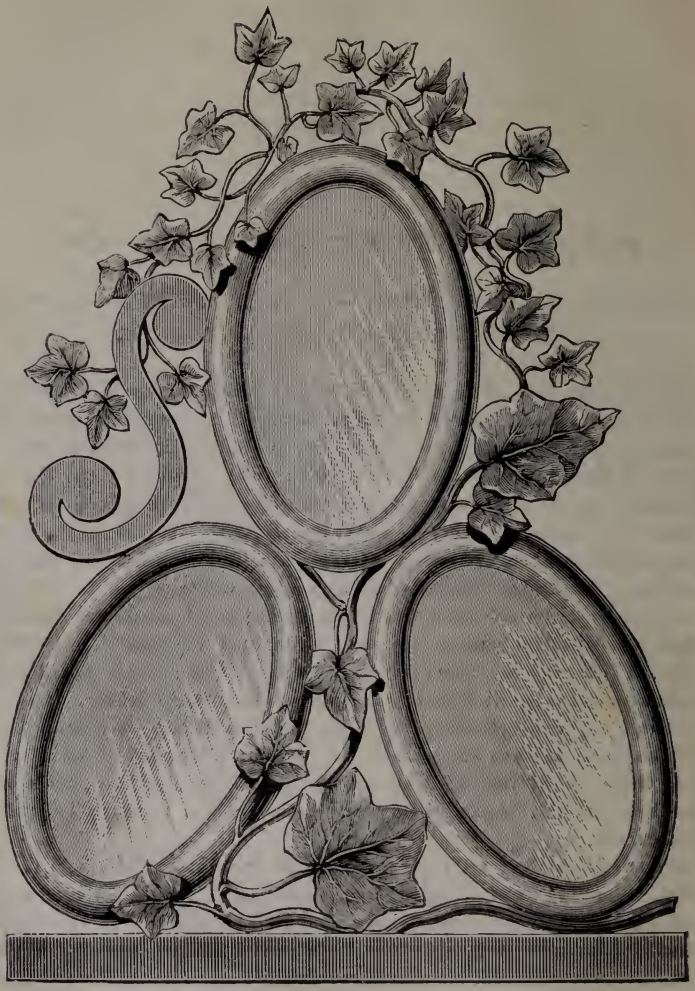

FIG. 36. TRIPLE FRAME FOR MEDALLION PORTRAITS.
(Fretwork and Carving).

various details of this character are often the secret of the beauty of a design. In one thing I have conventionalised the ivy spray purposely—namely, in showing all the leaves in plan instead of giving a certain number of them in profile; but if the individual leaves are varied in shape, size, and curvature, this will not become an eye-sore, as great relief is given by the grouping.

The object of the S-shaped scroll on the left is twofold: First, to aid in strengthening the frames on that side, and, secondly, to avoid the sameness which would result from a continuation of the foliage. A few leaves, however, are carried below it, to still further take off any formality. Although an appearance of relief is given throughout, the whole may be satisfactorily worked out of stuff a quarter of an inch thick. It would nevertheless be better to use a rather thicker board—say $\frac{5}{16}$in. thick—and sycamore would look very well. This will allow of plenty of stuff to take the rebates of the three frames, all of which are rounded in front but flat at the back. A rebate is not absolutely necessary, unless a glass is to be fitted, as a photograph is easily held close to the wood by a little tack or two, or by a button filed out of sheet brass; but if the photographs are to be glazed, a rebate should decidedly be made.

In this pattern the main difficulty will be found in getting out the thin leaf stems, especially where they do not run parallel with the grain of the wood. They must be sawn wider than they are to be ultimately left, and worked down little by little with a sharp penknife, filo, and rasp, until satisfactory. The piece of wood selected will have the grain running directly up and down, or nearly so, as it will be more easily worked in this way. The best plan will be, after marking the design by tracing and carbon paper, to cut out the oval frames—the inside first of all, and then the outside. It is usually better to work these, because an arch or curved piece is very strong, and will resist pressure on the outside, but is weak when force is applied from within, on the hollow or concave side. A good many holes will need to be drilled for the saw to get out the leafage, and much thought should be given to the general order of proceeding. Wherever a weak part appears, let it have all possible support till the last moment, when you are actually obliged to separate it finally from its nearest attachments. In the case of a fine leaf stem, now that we are associating carving with the fretwork, it may be even advisable to round and cut the stem as far as possible before using the saw to perforate the wood on each side of it, a plan that will be better understood when I have said something about the various carver's tools ordinarily required.

For the kind of work contemplated, which is rather the improvement

of the appearance of fretwork than carving properly so called (chiefly the production of work from a solid block), no extensive assortment is needed. A V tool or screver is the first, this being similar in form to a strip of paper folded sharply lengthwise and ground at one end from within to form two keen cutting edges meeting at an angle. The other end, drawn out into a solid tang, is handled like a carpenter's chisel, the handle being round or octagon to give a good hold to the hand. This tool is used by the carver to cut a groove around the borders of his work; and in order, in our present work, to get out cleanly a leaf stem, this tool would be used to cut a deep groove on each side of it, leaving it standing up between them. For fretwork this would also be a good mode of commencing such a stem, and, with the same tool laid more on its side, a little partial undercutting could be done. Then, at last, the hole having been first drilled for the saw, this tool would complete the severance of the stem from the adjacent wood, and leave it nearly finished, and needing only a little more careful rounding with a file. On the other hand, to cut such a stem solely by means of the fretsaw, it must be cut clean out and separate from the adjacent wood before anything like shaping and rounding can be effected. Then, as in many cases such stem will have the grain of the wood running across it, the most delicate handling will not always preserve it from fracture during the operation of filing and finishing; hence, in most cases, a leaf stem in a bit of fretwork is left so wide that, compared to the leaf, it is far more like a tree trunk or large branch than what it is intended to represent. Fretwork uncarved has exactly this heavy and lifeless appearance, and it is quite astonishing what a few touches of the carving tool will effect in giving to such work an artistic appearance.

The screver is also used to cut imitation veins, either by simply cutting a few V-shaped grooves where the veins are in the natural leaf, or by cutting away the wood on each side, and leaving a raised rib between. There is a tool on purpose, called a maccaroni tool, but we can do without it. Tools absolutely indispensable are gouges, which are of various curvature to suit the different curves of leafage or of other work. Some are almost flat, and are made with bent or straight shanks, the former being often absolutely necessary. The V tool and two or three gouges will do nearly all we are likely to need in the present case, as we have only to hollow out the insides of the leaves in various curves, some of which can be done entirely with one flattish gouge, followed by another very useful finishing tool, known as a riffler. A riffler is merely a bent file, the bent and cutting parts being at each end, and united by the straight part of the shank between. The tool is from 4in. to 6in. long, and some of them are rasp cut and some made with

single cut file teeth. They can be had at all tool shops, and serve many purposes of the wood carver. Besides gouges and the others mentioned, chisels are of course more or less needed, and these, like the gouges, may be had straight or curved in the shank, and of various sizes. All tools need to be keen edged as razors, for the highest class of work is that which is clean cut by the gouge, and not touched at all with file or sandpaper; but this will not be attained until after a good deal of practice has been gone through and experience gained thereby.

To use the carving tools, some care is necessary in holding them so that they may be always under control. A cut from so sharp a tool is generally severe, and may even be dangerous. The wood carver has plenty of hard mallet and chisel work, but the fret carver has only such as may be managed by a drawing, slicing, or straightforward cut, which requires but little force. Hence the tools can be worked by the muscles of the hand holding the tool, much as a knife is managed. The wrist rests on the work and the fingers are chiefly brought into use. Sometimes both hands are made to work; but in no case must the tool be allowed to run away; it must be snugly held and made to cut little by little. The wood will have to be attacked as often across as with the grain, and if this be crooked, as it often is, great care will have to be exercised to prevent breaking or splitting it. A chisel, bevel side downwards, can be made to cut a very smooth concavity, but bevel up it will only shave off plain surfaces. The advantage of having several gouges, each of different curvature, is that you can dig out hollows of various forms, according to the size and curvature of the leaf in hand. With wood ¼in. or $\frac{5}{16}$in. thick, it is plain that such hollows will never be very deep, else we shall cut the stuff quite through, an accident not at all unknown to beginners, and in many cases irremediable.

Recalling to mind what was said about the best order of proceeding, it will be remembered that I advised leaving as long as possible any wood adjacent to a part liable to get broken. This holds good with respect to carved fretwork, and the hollows of the leaves may be often worked out more safely and satisfactorily by carving this part of the leaf first and sawing the outside subsequently. The bulk of the parts to be removed is thus got rid of while the work is solid and strong, and then, after it has been wholly cut out by the saw, a very little carving and shaping of the leaf edges and stems will render it complete. In the triple picture frame it will be noticed that there are two leaves overlapping the actual oval frames. These are well worth attention, because they give an air of looseness to the foliage. Now, in a case like this, it must not be considered necessary to have to lower the whole surface of the work merely to leave higher than the rest these two small leaves, but

we must manage in some simpler way to give them the desired appearance of relief. To effect this, we must gradually lower slightly the frame itself on each side where it is in contact with the leaf, and cut the outline of the latter as sharply as possible, so as to define it very clearly indeed. We must also, then, undercut it slightly. The lowering of the surface of the frame should be repeated on the side opposite, so as to keep the whole parallel and out of twist, and, carefully managed, it will hardly be detected. The only other plan is to glue on a little block and carve this as the leaf—a plan lawful, perhaps, rather than expedient, but which must sometimes be resorted to for the saving of labour and material. A regular carver has often to fairly build up his work in this way, and will so manage as to make the lines of the carving wholly conceal these joints. But a small article like the present can, for the most part, be cut out of comparatively thin board, without any such additions of material.

The bottom bar is to be left quite flat and plain for the frame to stand upon when finished, and, to render it serviceable, a support can be hinged near the upper part of the back, or there can be a bottom hinged on or otherwise fastened to the lower part, so as to give the whole the form of a small easel. The S-shaped scroll on the left-hand side will probably look well not rounded at the edges, but left quite flat, as shown in the drawing. It is easy, however, to bevel its edges, or to round them off if preferred. I may here mention that in case of a leaf stem falling just where a knot may be in the wood, or a bit of twisted grain, that may render it more difficult to work, it is lawful and wise to shift the leaf or stem by sketching it in a little differently. A great deal of difficulty in working may be sometimes avoided in this way, and no one need be so tied down to a pattern as not to venture slight alterations where such seem advisable.

As a finish to the surfaces of the three frames after rounding, the matting punch will be as effective as anything, but I should be inclined to do this before separating the frames entirely. They can be left plain, however, or worked with crossed lines, forming chequer work, which can be done with the edge of the riffler or with a saw file. Carvers also manage with the edge of the gouge to make a kind of chequer which is effective in such cases. The tool is stood on end, or nearly in a perpendicular position, and "walked," so to speak, along, cutting out in its progress small crescent-shaped pieces at nearly equal distances. It is a quick operation, and, in their hands, one which leaves excellent results.

Fig. 37 is a normally-shaped oak leaf, to the peculiarities of which attention should be paid. It is an excellent example of Nature's varied symmetry. In the first place, the two sides are not equally broad, the

mid-rib not dividing the leaf symmetrically. Out of a hundred leaves you will find ninety, at least, thus irregularly formed. Then, again, look at the lobes—similar in their rounded form, but no two alike. At the top left-hand corner (A) there is generally, if not always, a half-developed lobe on the narrowest side of the leaf, and, as we near the stem, the lobes become a waved outline more or less irregular. The venation, or veins, of any leaf generally follow the order in which the branches and

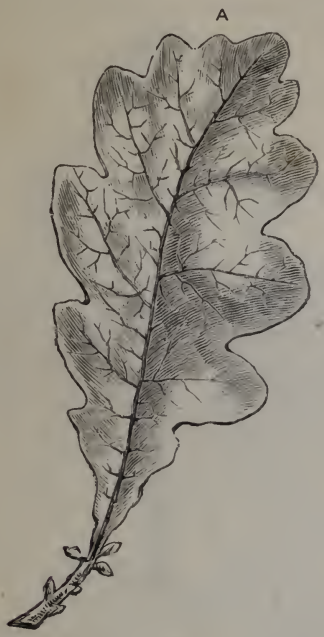

Fig. 37. Oak Leaf Natural.

twigs are placed. They are, in fact, a continuation of them, conveying the sap to the capillaries, which form a network over the whole surface. The midrib sends out in the oak leaf alternate branches, one to each lobe, and these subdivide into a great number. Besides these, there are other shorter branches starting from the central or mid-rib which are less conspicuous. The ribs stand out as ridges at the back, but are level with the surface in front. The smaller ones do not project in this way.

The oak bears its leaves in tufts at the end of the small twigs, and

also spirally around them below the tuft. The buds in the drawing show where the following year's leaves would be. These buds, by their growth, have already pushed and broken off from the tip of the shoot all the leaves but the one sketched; and it often happens that a few dead leaves hang on until the buds, swelling in the late spring, detach them. Some few trees keep in this way nearly all their foliage through the winter, though it is withered and brown. I think it is so with hornbeam,

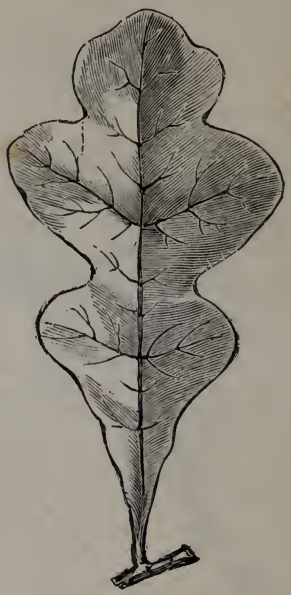

Fig. 38. Oak Leaf Conventionalised.

and with the beech, if the latter is kept clipped, as it sometimes is, to make a hedge.

If I had not first given an accurate description of a natural oak leaf, Fig. 38 would by many have been accepted as such. This, is, however, idealised, or treated in a conventional manner, as it would be if used to form part of a geometrical pattern. It is, in fact, geometric, and not picturesque or natural. The mid-rib divides it equally, and each side is a counterpart of the other. The veins are opposite instead of alternate, and the lobes are in pairs. Now, in designing a bit of fretwork, this

leaf would be far easier to draw than the other, for this simple reason: You can fold a bit of thin card down the middle and cut out the form with a pair of scissors, and thus obtain a symmetrical leaf, round which you can run a pencil and make as many copies as you please. But with the other you cannot do this, as the sides do not match, and you have to draw it in detail even if you are going to cut it out as a pattern or template. But then, in one case, you get a beautiful form; in the other an ugly one. The extra trouble is well repaid by the result. But if you once really learn the peculiarities of the leafage of trees you will be

Fig. 39. Oak-Leaf Design for Frame.

able very soon to sketch groups with tolerable correctness, suited for fret sawing and carving, while, at the same time, it is quite allowable to use the conventional form of leaves in order to set out a geometrical design, and then cardboard and scissors will help you greatly. I cut out Fig. 38 in this way, as the easiest method of getting the two sides of the leaf alike, and the same plan is used in designing a geometrical pattern (see Fig. 39) founded on the oak leaf, for fretsaw and carving tool.

The three leaves in this sketch are sufficiently like oak to give a name to the design, but are placed formally, and made part of the support of the two frames intended to receive portraits of any happy couple who may choose to keep photographic records of their personal appearance. The whole is easy to cut out, and has but one or two weak parts, and of these the flat band in the upper part above the leaf may be considerably strengthened by allowing it to touch two of the opposite leaf lobes, thus becoming solid with them. These bands are to remain flat as sawn, and the frames alone rounded on the face. The leaves are meant to be hollowed more or less where shaded, principally about the mid-rib, where most leaves are somewhat concave. Some of the lobes, too, should be cut away in a similar manner, and especially rounded off towards the edges, which should appear thin, by being undercut. There is one point in which it is absolutely necessary to conventionalise, namely, in respect of the mid-rib and radiating veins. These in the real leaf are only seen by the difference of colour in the face of a leaf, and we must therefore invent some mode of delineating them. The usual way is simply to groove with the V tool in the direction of the veining, which will answer the purpose very well for such an entirely conventional leafage as we are describing. Sometimes a light groove is scored on each side, leaving a centre portion to represent the mid-rib. There is often such a depression when the rib does not actually rise above the surface of a leaf. Either method will serve to give an appearance of veining, but, of course, the second is more troublesome, as it is not easy to keep the grooves parallel, or to make them slightly but evenly converge, so as to have the intervening rib thin at one end. The groove or grooves should gradually get shallower as they approach the end of the leaf.

This design may, like the last, take the form of an easel to decorate a table or mantelshelf, or may have a small brass eye at the top, or a bit of ribbon, by which to suspend it against the wall. But if made about six and a half inches high by four and a half broad, it will look better on a table, as so small an article gets lost in the wall space around it, unless, indeed, it forms one of a group, and is dark on a light paper, or the contrary. Such a design as the present, carved in black wood, ebony, or walnut, with oval frame of ivory, would be very handsome. The ivory might be simply a veneer glued on to the wooden frames left flat on the surface on purpose to receive it. Thicker ivory frames would need to be cut and turned in an oval chuck on a lathe, but thin pieces can be bought cheaply, and are easily cut with a fretsaw.

There is often difficulty experienced in drawing ovals, or, more properly, ellipses. I have given one or two methods ; but the easiest plan, I think, is to double a bit of stout paper and cut out a semi-ellipse by the eye of

the size required. This can be trimmed to shape if not quite satisfactory, and, when opened out flat, is to be used as a template to draw with, by passing round its outline a well pointed pencil. Having had occasion to draw this figure a great many times, I found, on inquiry, that the elliptic trammel was not suited for ellipses of small size, and was, and is, like other instruments for this purpose, a costly affair. I vainly tried to design some kind of cheap and satisfactory substitute, but failed, as so many other experimenters have done. At last I set to work to cut out ellipses of card and paper, and found the plan very serviceable.

It has appeared to me that a mathematical instrument maker who would sell these, cut out of card or horn or thin brass in assorted sizes, would find a sale for them readily, and they would serve as French curves as well, in many cases. If made for sale they would probably be punched out, and the cost per dozen would be next to nothing after a set of punches had been made. Lacking these, I should be inclined to suggest cones of boxwood, sawn subsequently at an angle into elliptic slices a quarter-inch thick, as they would be true ellipses, and would afford a set of very useful templates, each with two sizes of ellipse upon it. A pencil would work easily around them, or even a drawing pen. Thin ivory would form a still better, but more expensive, material for these pattern ellipses. I put forward these suggestions rather for those who have to make many machine drawings or designs in perspective than for the amateur frame-maker, but the latter will decidedly find the advantage of using ellipse patterns of card and paper shaped with scissors by the eye and hand alone. In drawing, also, any design with two symmetrical sides, such as the elevation of a vase or the geometric tracing on opposite sides of a frame, it is a far quicker method to cut out a folded piece of cartridge paper to use as a template than to get out a free-hand drawing, which is, of course, the orthodox method of proceeding; anyhow, I do not hesitate to give the plan *quantum valeat*.

Sharpening tools is by no means an art that comes by nature, and for even the simplest carving it has to be learnt. In London it can be shirked by payment of a small sum at a tool shop, and the operation is sure to be well done, or, at worst, a deal better than by a tyro. But shirking is not the way to learn, and to those especially who live in country places the above means are less readily available. The grindstone will not be very often wanted, as notches ought to be the rare exception, and a rub on a good oilstone (real Turkey) will generally suffice to renew the bevel. But this should be followed by a strapping upon a bit of buff leather faced like a razor strop with the finest emery

paste. No care can be too great for the preservation of a fine and perfectly burnished edge, as nothing less will enable the carver to dispense with glass cloth. In grinding, when the whole bevel is to be renewed (which is necessary when it gets short, and the angle of edge thereby too large), the difficulty is to keep the tool steady and firm at one level on the face of the stone. It must be traversed from side to side to keep the stone from getting hollow and uneven, but not allowed to rise above or get below a certain level. If the stone turns away from the workman, the tendency will be to carry the tool up towards the top, and *vice versâ*, and this must be prevented by hugging it pretty stiffly with the elbows against the sides.

Most tools should be ground with the stone running towards the operator, as it prevents the formation of wire edges. A gouge may be held across the stone and rolled over backwards and forwards, or ground with the stone running away from the workman. If a wire edge forms on any tool, strike it into a bit of wood or draw it across a bit of hard wood, and it will come off. Then rub it again on the oilstone and leather strap till the edge is perfect and free from any trace of this wire. Sometimes in oilstoning it will form again and prove troublesome, but it is not a very serious matter to deal with. It is, in point of fact, almost impossible to run the stone towards the edge when the tool is pointed or narrow, like small gouges and chisels, and the wire edge must be put up with and got rid of afterwards. This is a deal more satisfactory than to find the tool stick, and plough a deep groove or make a hole in the face of the grindstone, and in all likelihood carry off a bit of one's knuckle at the same time.

The gouges and V tool cannot be finished without an oilstone slip to rub on the inside of the curve or angle. These are wedge-shaped bits of oilstone rounded off at each edge, so as to get two sizes of tool, but that for V tools is *sharply* wedge-shaped, and, of course, not rounded in the least at the thin edge. It is difficult to prevent so sharpening a V tool as to give it a notch in the angle; and to get each side alike in bevel, and meeting in an acute angle, requires practice. It is ground from the outside and finished from within, but larger sizes of the tool used by coachbuilders are ground on an angular stone or grinder from the inside and kept quite flat on the outer faces. Similar tools are used by the turner to cut screws in soft wood. Being difficult to keep in good order, every care ought to be taken of them, and the smaller ones may be well protected by sticking the ends into a bit of cork, or keeping them in a leather case. A carver is as careful as a barber in keeping his tools in first-rate condition.

Another small oval frame is shown in Fig. 40, in which the difficulty

Fig. 40. Oval Design for Photograph Frame or Hand Mirror.

is enhanced by the introduction of one or two of those spiral tendrils common to the vine and some other climbing plants, such as the white bryony. These require most careful and gentle handling, and the whole frame must be made of a wood with as little grain in it as possible. They may, of course, be omitted if the trouble of carving them is considered too great. Apart from these, which must be done with drill and round file more than with a saw, there will be found quite enough work in forming the leaves and stems, and making them overlap each other properly. This design will also make a pretty frame for a hand mirror, the glass of which should be carried as far as the outer oval ring, and the lower stem may be lengthened to form a handle. Another method of using and decorating a frame like this is to keep the central part for the photograph, with an annular mirror for the rest, behind and between the leaves. The latter must be kept quite flat at the back, so as to touch the mirror, because we do not want to reflect that side of the leaves at all, but merely to use the silvered mirror to enhance the general effect. The simplest way to manage this is to get a glazier to cut out to an oval shape a bit of looking glass, and then, after carefully fitting it, to remove the silver from the central portion, and thus make it answer as a plain glass, covering the picture behind it. If this plan is carried out, the oval rings must be stouter than represented, and grooved with a rebate to take the looking glass, which, again, must not be thick plate glass, but the thinnest obtainable.

The vine leaves here are very irregularly shaped, which is to some extent the case with the natural plant; but I have given in Fig. 41 a sketch, made some time ago, from a vine leaf, in which the general form will be recognised as three-lobed, but with more or less deep subdivisions. In fact, you cannot lay a vine leaf down flat so as to draw round its outline. The lower lobes, *a*, *b*, overlap each other, and the stem also, as shown at *c*, below, and this is partially the case where the other lobes unite, and the leaf is thereby thrown into a waved form of surface, which for best work should be carefully copied from Nature. In order to excel in this sort of work, careful copies of all kinds of leaves should be made during the summer. Until the experiment is made, few would have an idea of how very little they know of Nature's handiwork. Let anyone sit down and draw from memory a few leaves of the commonest wayside plants—clematis, bryony, black and white ivy, and the leaves of the oak, sycamore, lime, and other forest trees—and, unless the subject has been taken up as a study, the result will be as satisfactory as a pig drawn with one's eyes shut, with its eye, very probably, in the region of the tail. We certainly ought to consider it a disgrace in these educational days not to know something of leafage and the forms of most of the plants

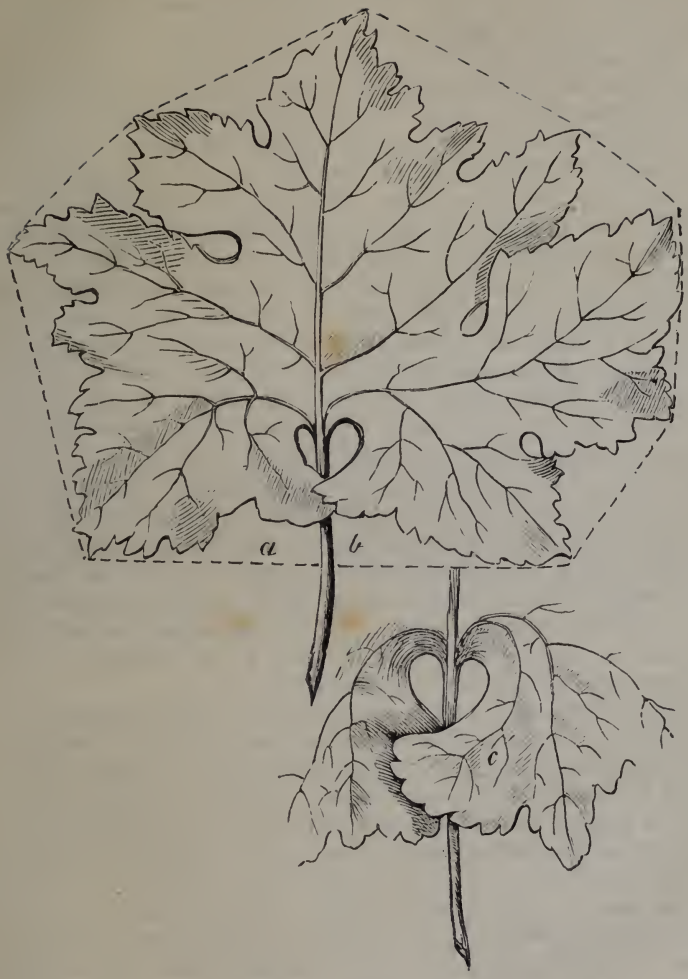

Fig. 41. Study of Vine Leaf from Nature.

which adorn our banks and hedgerows, and no real progress can be made in wood carving until that knowledge has been acquired so far as to enable the workman to draw on the wood from memory any leaf or cluster he may desire to imitate.

There are several ways by which exact copies can be taken of any leaves that can be pressed flat, and others may be also managed by pressing down part at a time. The truly artistic method is, of course, by freehand drawing, which may be simplified by first drawing a line representative of the main outline of the leaf, like that dotted in Fig. 41, taking in the main divisions only. The delineation of the several lobes will not then be found very difficult, even by those who have had scant practice in drawing. Another plan is to cover the leaf thinly with printing ink, and, having damped a sheet of printing paper slightly, lay the two face to face with a board on each side, and submit to the action of a press, easily extemporised by standing upon the top board. Carbon paper may instead be laid on the leaf, then a pad of blotting paper, and the whole pressed as before. An ordinary copying press is very well suited for this purpose. Then, again, there is the sprinkling process, by which, without any press, a leaf or group of leaves can be taken off, and a picture in white or grey obtained. This mode was largely used at one time for printing ferns on dessert d'oyleys, for making screens or blotting-pad covers, and for a number of other useful articles; and it has this advantage in respect of devices for frames, that groups of leaves can be arranged almost as easily as single ones. The drawback is that only a flat or plan view is obtained, one leaf overlapping the next, but lying quite flat upon it. By shading, however, some of this drawback may be surmounted.

The apparatus for this latter process is not of a costly character, consisting only of a board, a few pins, a brush, and some sort of comb, the best brush being one of hog's bristles cut off short and square; a tooth brush is often used for the same purpose. The ink is generally Indian ink, as being of a nicer colour than the ordinary writing fluid, but any coloured solution, such as Judson's Dyes, may be substituted if variously tinted work is wished for instead of black or grey. The leaf to be copied is laid upon the sheet of paper (or linen or other substance) and held down by a few short stout pins, so that it shall lie close, especially at its edge. A little ink is then taken up on the brush, which is drawn across the teeth of the comb so as to produce a fine spray, which falls upon the paper, where not protected by the leaf, the latter always appearing in white upon a grey ground. When the first leaf is thus done it may be removed and another arranged to overlap or otherwise, and the sprinkling continued; or the whole design may be pinned down at once and worked

in the same way. By a little ingenuity, however, the leaves and interstices can be far more artistically delineated by shading produced by sprinkling some parts more than others. Thus a groundwork of lightly-sprinkled shading may be first laid on and then a leaf pinned down and the sprinkling repeated, giving a light grey leaf upon a darker ground. But there is no further relief possible in this way, and if the curvature of a leaf needs to be shown it can only be done by still more delicate shading, confined to certain portions of the leaf. Still, something may be effected in making designs for carving, to be subsequently transferred to the wood itself.

The main object in view, however, is the preparation of a stock selection of leaves of all kinds, to form a scrap-book, from which groups can be subsequently designed, and for this purpose it matters little which method is adopted. Some of the ferns would do well carved upon a frame, while others are too delicate to be thus treated with effect. The polypody and the harts-tongue are broad enough in leaf, and so is the common bracken. The maidenhair may be copied, but the stem is too fine to be executed in wood.

CHAPTER VIII.

LEATHERWORK FRAMES.

Leatherwork as a Substitute for Carving — Necessary Appliances and Materials, Modelling—Fixing the Mouldings to the Frames.

A few years ago leatherwork was all the rage. Leather is indeed a substance peculiarly tractable, because, if moulded wet, it will retain when dry the curvature given to it, and even the colour is of a pleasing brown, very like oak—dark or light, as the case may be. To use this substance, therefore, as a substitute for carved work, was but natural, and it was by no means the first time that leather had been pressed into service for ornamentation. Nevertheless, we do not find much of such work now carried on. It came in with a rush as a new fashion and amusement, and, having lived its little day, was almost relegated to limbo, for, curiously enough, it was not superseded by any other work devoted to the same end. It may yet, however, come again to the fore, and as this book would not be complete without, I will briefly describe the *modus operandi*.

Of course, we must have a plain wooden frame, first of all, as a foundation upon which to nail or glue the leaves cut out of leather, and we must sketch a design, if only roughly, before we can tell whether the frame should be made flat, bevelled, or as a moulding. It is of no great importance what wood is used for the frame; deal will do well enough, and can be stained if desired, but much depends on the tint of the leather, which is sometimes darkened and varnished, and made to match in general appearance the frame below it. But the nicest leatherwork I have seen was of a light brown, not stained or varnished at all, and it gave the impression of work carved in sycamore. Most of the amateur work done at the time referred to now appears very inartistic in style, leaves thin, and warped out of all shape, but highly varnished, and looking as if a glue pot had been capsized over them. As harbours for stray dust and dirt, these frames prove to have been eminently

suitable. As a general rule, it is better to make leaf edges curl down towards the frame instead of upwards, so as to conceal the thin edges, as these convey an impression of poorness and want of solidity. This may seem strange, considering how thin is leafage in nature, yet it is true—probably because we mentally compare such work with wood carving, in which strength and solidity are always associated with lightness and delicacy.

The appliances for leatherwork are few; scissors and a sharp penknife, with a few tools of boxwood for assisting to mould the leaf into a proper curvature—a few bits of wire and a stiletto will suffice for most, but there are various moulds obtainable at fancy shops. All that is really wanted is something rounded, like the top of a thimble or the handle of a stiletto, to assist in curving the leaves of foliage and petals of flowers. The hollowed palm of the hand serves as a concave moulding tool, and, indeed, the fingers are in most cases the really efficient tools; but divers utensils of every-day use will be pressed into service when it is once found what the real nature of the work is. The leather used is basil, which should be specially selected, clean, and free from defects, and also a thin leather called skiver for rolling up to form fine tendrils, covering grape moulds, acorns, and the like. A small bottle of size, a glue pot, and gum, will also be needed, with a little strong thread or fine string.

Suppose, now, an oak leaf is to be made. Lay the real leaf or a card pattern upon the leather and mark it round with a fine hard pencil or the point of a stiletto or scissors. Cut it out very clean with a pair of sharp scissors, leaving no sign of a rough edge. Then throw the leaf into water, till well damped throughout. Now with the fingers and any convenient tool mould it into shape, hollow here, convex there, and set it aside to dry. Then size it well inside, *i.e.*, on the under side, and when dry it will be stiff and hard, retaining the shape given to it. Stems are cut as strips, and then wetted and rolled on a board with the hand, succeeded by a flat bit of wood or the ivory handle of a dinner knife. Berries, and nuts, and grapes, and things of that kind, are easiest made by covering a mould of cork, wood, or the thing itself, if an acorn or nut, with skiver, and tying it on tightly till dry. A wire stem is added, as may be necessary.

The tie must, of course, always be arranged on the side next the frame, for though the string is to be removed when the whole is dry, the puckering will, to a certain extent, remain. This can be pared off when necessary to allow the part to lie flat and even upon the frame. To attach the leather various means are used—glue or strong gum. Short needle points, sprigs, and pins will each and all serve in their own proper places, and any projecting part may be concealed by the arrangement of

the several details. In some cases it is advisable to fill up quite solid the concave back of a leaf, and this may be done by glue and sawdust, or by running plaster of Paris into it, the plaster being about the consistency of clouted cream. This will set very speedily into a perfectly hard dry mass. Before it is dry the heads of one or two fine tacks may be buried in the plaster, and these will serve to attach the whole to the frame to assist the glue in securing it. This solid work is not often needed, but will sometimes prove advantageous in working up a design. Plaster moulds are of value, and so are gutta percha ones. Suppose, for example, you wish to imitate a pod full of peas. All you have to do is to take such pod and oil it, and then imbed it to half its diameter in plaster, and in ten minutes you may lift it out, and its exact impression will remain, into which to press the wet leather. Gutta percha has only to be placed in hot water until soft, and then pressed upon the article previously oiled to prevent it sticking.

You may also use skiver in a wet state, and cover the real pod with it tightly, leaving it inside. Thus inclosed airtight in its leather skin the pod will last a long time, and when dry and shrivelled the leather will retain its shape perfectly. Acorns are thus made by covering real ones, and tying the leather just where it will be subsequently hidden by being glued inside its cup. For the latter a round disc of basil is cut and moulded over a thimble, which will also serve to indent it and imitate the chequerwork upon it. In fact, a thimble will prove a very serviceable moulding tool for many other articles. A very keen penknife is necessary to trim the edges of such acorn cups, and a blunt one will spoil everything attempted. A vine tendril would be cut as a narrow strip, which, after being made round by rubbing, and wetted, must be coiled round a knitting needle or penholder and left to dry, when it will retain its spiral form. As I stated before, I am not an admirer of varnish, but what is called glaire by bookbinders, which is, in fact, white of egg, may, perhaps, be used with advantage to give a finish to the work. The egg must be well beaten to remove all tendency to ropiness, and a couple of drops of sweet oil may be added with advantage. This will not polish the leather like glue or varnish, but will give it a higher finish. All glue or size used for the purpose of stiffening is far better brushed upon the back of the leather. With these few remarks I shall leave this subject, as practice will soon render leather work quite easy.

CHAPTER IX.

ADDITIONAL TOOLS AND MATERIALS.

Useful Sets of Frame-making Tools—Fretsaws—Circular Saws—Stains—Varnishes—Polishes.

Although in the body of this work I have had occasion, now and then, to speak of certain tools and tool shops and of materials, yet I have thought it better to devote a brief chapter specially to this subject. In these days of railway accommodation, it is far better not to buy carpenters' tools in the country; London, or other large towns like Manchester, or Birmingham, or Sheffield, afford so far better a choice at a cheaper rate. But there are some who make a speciality of tools for special work, and I happen to know of one at Cirencester who sends out a good useful box of tools for frame making that may be relied on, viz., Charles Savory, St. John's-street, Cirencester. The cost of the best is only 24s., and it contains shooting plane, saw, mitre block, shooting board, gimlet, pliers, bradawl, brads, and hammer; the box having also a tray for the nails. Mr. Savory, as a practical frame maker, knows exactly what is needed for such work, and has made a careful selection. With the above and a stout table, the work of frame construction can be well carried out. For those who desire floral ornaments in plaster and compo, Mr. Savory's shop will supply these, as well as gilded mouldings, maple, and other requisites. For planes, saws and general tools, Buck, Tottenham-court-road, is always reliable; but of London tool shops the name is legion.

Suppose the amateur to live at a distance from town and station, he must perhaps patronise his nearest country town, and his wants are so simple for mere frame making that it must be a poor place indeed that cannot supply them. Most ironmongers keep saws and planes, and any cabinet maker or joiner can make mitre and shooting boards, as these are

used by them constantly. In fretsaws, the Britannia Company, Colchester, are probably as reliable as any, and make several kinds for hand and foot. I have also suggested to them (in accordance with the observations made in this book) to increase the size of platform, which they intend to do. Their machines I find in most country towns, but there is no difficulty in sending them direct to any address.

Mr. Samuel Smithers, who has saw mills at Old-street, St. Luke's, London, E.C., advertises wood of various kinds and sizes, but does not keep ebony or any of the ornamental foreign woods. Then comes Melhuish and Sons, Fetter-lane, and Churchill, 28, Wilson-street, Finsbury, who has all kinds of American tools, inclusive of special mitring apparatus, metal planes, fretsaws, and supply of wood. I think at either of these the most particular of amateurs will find all he needs. My own experience leads me to recommend application to such men as these for wood as well as tools, from the difficulty I have found in obtaining them in country villages, or even country towns. You may be able to get maple, or strips of birch, or mahogany at a friendly joiner's, but only as a favour and at a price which would obtain double the quantity in London. A few lines explaining your need, and, say, 10s. enclosed, will insure a selected assortment from Mr. Smithers sawn to size; and any other of those named will similarly send out a supply. In most cases, however, unless you buy from such a man as Savory, you will have to rebate and plane up the mouldings yourself, and that is why I have suggested application to him.

Rebates and mouldings require a rather more expensive outfit than I have contemplated, moulding planes especially being dear to buy and requiring great care in sharpening. A mere rebate plane for one size of rebate is cheap enough. Hence the strips of moulding ready made are much to be preferred, and will afford abundant exercise to the amateur in fitting and finishing.

I here give a sketch (Fig. 42), illustrating a circular saw stand, &c., made by the Britannia Manufacturing Co., of Colchester, that is admirably adapted for picture-frame making. I may further state that it is not only an amateur's tool, but is used by several picture-frame makers. It will cross cut, mitre, and rebate, the table being hinged so that only a very small portion of the saw may be used for cutting rebates, or the whole available width of a 5in. blade. The mitre guide is shown at the right hand. The upper table is raised by the screw underneath on the left hand. The heavy flywheel enables real work to be done. The rising hinged table is invariably needed when it is

intended at times to use the circular saw for cutting grooves which are not to go quite through the stuff. The hinge, being next to the workman, brings the lowest part of the table nearest, and there is no difficulty

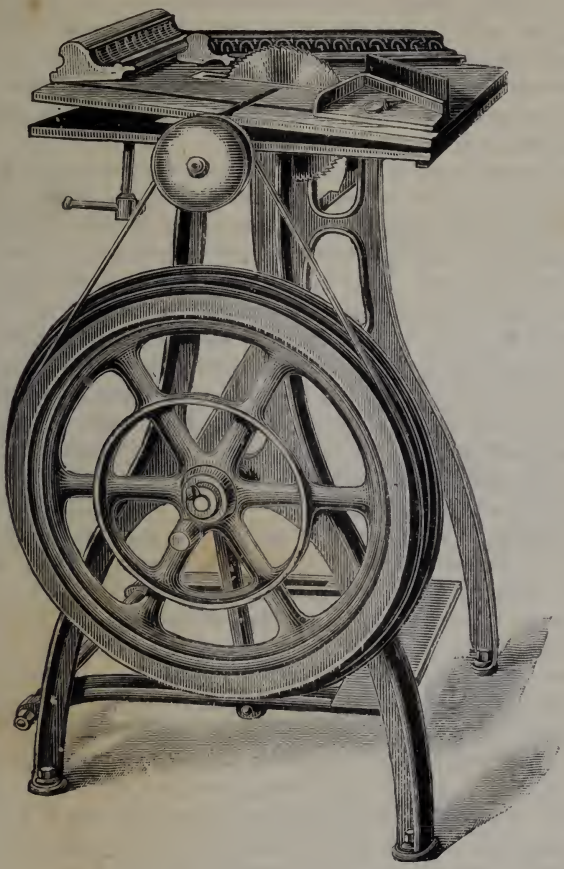

Fig. 42. Circular Saw and Stand.

in sliding the stuff up the slightly inclined plane which is thus produced.

Holtzapffel, in his "Mechanical Manipulation," details a saw fitted to run between the lathe centres, in which it is half in a box, which is fitted

with a tenon and held by a bolt, the same as the poppits of the lathe. A stout cover of nicely planed oak or hard wood is then hinged to the box, but so as to overlap it and form the rising table, a slit being cut by bringing it down gently upon the saw, which then makes the slit only wide enough to clear it nicely. The cover is fitted with guides for mitring or parallel work. If well made, this fitting answers well, and is cheap, but not nearly equal in convenience to a separate saw table. Six pounds at the present day is not to be lightly regarded, but the real expense incurred by amateurs is the money frittered away in experiment and in useless tools.

Twenty pounds may be set down as covering the necessary cost of a very serviceable outfit, which will include that required for picture-frame making, and enable a careful amateur to do a lot of useful and ornamental work. But £50 and more may be spent and the result prove entirely unsatisfactory. For merely making frames, of course, far less is required; 25s. at Savory's will give, as stated, a complete outfit, including mitring block and a shooting plane, saw, and all necessaries; but I do not imagine the amateur frame-maker will fail to practice mechanics on a more extensive scale, and these chapters rather pre-suppose that he will add frame-making to his ordinary lathe work and carpentry. For frame making alone, no amateur requires a circular saw, but it is one of the greatest treasures in a workshop if a course of general mechanics is to be carried on.

As a finish to such frames as require the grain of the wood well thrown up, French polish, beyond all question, produces the best results. This is variously made, but the simplest and best is a solution of shellac in spirits of wine with a little sandarac added. It should be about as thick as cream, not thicker, and for a final coat a special bottle may be kept of thinner stuff. To lay it on satisfactorily is a matter of practice, for though the process is simple, the result is not always such as it ought to be. The wood, which may be soft or hard, must be well prepared to a perfectly smooth face, and then all dust wiped off clean. If soft wood, it must receive a coat of size to fill up the pores, and when this is quite dry it may be rubbed down, and the sizing repeated. If this is not done the wood will suck up the polish and waste it considerably, as a number of coats will be necessary. After again papering and dusting, the wood will be ready for the polish. Tie up a ball of cotton wool, enclosed in linen rag, so as to make a smooth wad about as big as a walnut, the tied ends joining in a sort of handle. It should be pretty firm, though soft. Upon this pour a few drops of polish, and cover with another bit of rag, on which place one single drop of raw linseed oil. With this rub the wood lightly with circular

strokes, pressing harder as the polish evaporates, so as to squeeze out more. The outer rag acts as a strainer, and the oil prevents it from sticking to the work.

At first the object is to get a good coat of polish on the wood, and it will look smeary and generally unpromising. Rub till dry before replenishing the wad with more polish, but not till so dry as to scratch. Leave to dry a few hours, and when quite dry, rub it down with glass paper numbered "00", the finest you can get, which may be still further improved by rubbing two pieces together. Dust off again, and repeat the polishing process little by little, and finishing (if a moulding) by a few light strokes straight along with the grain, sweeping the wad right off each time, for it must never stand still upon the work, or it will stick, and make a mark difficult to erase. Leave again to dry, and if not satisfactory, go over it again with thinner polish and a lighter touch; and finally, when quite dry, with a clean rag and just one or two drops of spirits of wine, wipe it off quickly and very lightly, to remove dull spots caused by the oil. If too much spirit is used for this, or it is done with too heavy a hand, the polish will be removed, and will require to be laid on again.

French polishing is not at all easy if the surface is large, and deep mouldings are also a source of difficulty; but, like every art, it is worth learning. Some woods absorb a great deal, and are first gone over with "filling," which is plaster of Paris made into a creamy mixture with drying oil (boiled linseed oil, used by painters). This is rubbed in and allowed to dry, and then papered off and finished with a flannel slightly oiled. The French polish will not then be absorbed, but will remain on the surface. In mitred frames the ends of the pieces are not exposed, else it would be found difficult to finish these; but when it is necessary to polish the ends of stuff, a good deal of filling is used, and the grain rubbed down quite smooth. In Oxford frames the end of the grain is necessarily then exposed, and it must be filed and worked to as smooth a surface as possible before any filling or size or varnish is applied.

It often happens that French polish cannot be applied to frames, as, for instance, in deep carving, and in that case the polish used is put on with a brush. Brush varnishes are made of various gums dissolved in oil or spirits, and should be purchased, as they are dangerous to make, and seldom so good as bought specimens. Common resin thus dissolved is the varnish used on cheap toys; but shellac, mastic, sandarac, and copal, or mixtures of these and other gums, are chiefly used and sold as white hard varnish (for light woods), copal varnish, mastic varnish, oak varnish, carriage varnish, &c., according to the special purpose for which

it is required. Most of these can be had of oil and Italian warehousemen, also at artists' repositories. Thin French polish can be used with a brush.

For staining wood for frames nothing can beat Stephens' Wood Stains. They are sold by grocers and ironmongers, and at colour shops, and have merely to be laid on with a brush. They are also easily diluted to any degree of lightness, so that satinwood can be as easily imitated as the darkest oak or rosewood. A very fashionable material is now real or imitation ebony; this for frames is, perhaps, less needed, except it be for frames used in cabinets, mirrors, and the like. Wood may, however, be thus stained for picture frames which, relieved by a gold mat, and perhaps a stripe of gold round the outside edge of the frame, will have a handsome appearance, especially among ebony furniture, now so general. The old method of staining is as good as any: A solution of logwood chips is first made, and brushed on hot, and when dry this is followed by a cold solution of sulphate of iron or green vitriol. This is again succeeded by a wash of vinegar and iron rust, *i.e.*, iron filings steeped in vinegar, when an intense black will result, but, of course, without polish. When dry the wood should be well rubbed with a handful of shavings, and afterwards varnished, or if required to be dead black instead of polished, it may be rubbed with charcoal in fine powder; heel ball is also used to add to the blackness of ebony stain; it is sold in cakes purchasable at any shoemaker's or leather seller's store. The ebony stain called Artists' Black is of a different character, more like Japan or Brunswick Black used for iron—Stephens' Ebony Stain is much better.

The usual defect in varnishing done by amateurs is too thick a layer put on at first, and often succeeded by another before the first is dry. Varnish should be thinly laid on by the brush, moved in one direction only, and not *lathered* on so as to cause bubbles. This must be allowed to get dry and hard before it is again touched, and for best work it should be at least once rubbed down with fine paper, and then re-varnished. Varnishing and polishing require, moreover, to be done in a warm room, as chilling varnish gives it a milky opaque appearance. Varnish brushes may be rinsed in finishing spirit, and dried or left in the varnish if the latter is fitted with a lid. If allowed to dry with varnish on them, the brushes may be cleaned by hammering them with a wooden mallet; this will powder the dry varnish, which will fall off as fine dust, and leave the tools fit for use again immediately. Do *not* try hot soap and water, or soda and water, which is only fit for cleaning brushes of fresh oil paint.

The amateur frame-maker may now be left to his own devices. Further directions will not be necessary, and practice alone will render him inde-

pendent of extraneous aid. If he desire to attempt gilding, there are manuals devoted to the subject, but without a regular apprenticeship his chances of success are very small. It will, therefore, be far more sensible to stick to plain and carved work, and in this there is no limit to the exercise of taste and skill.

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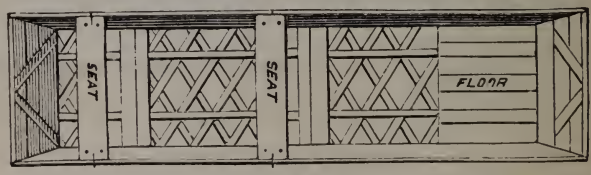

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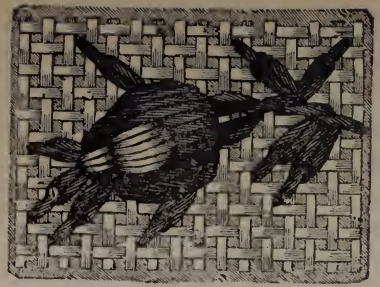

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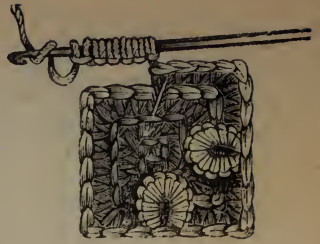

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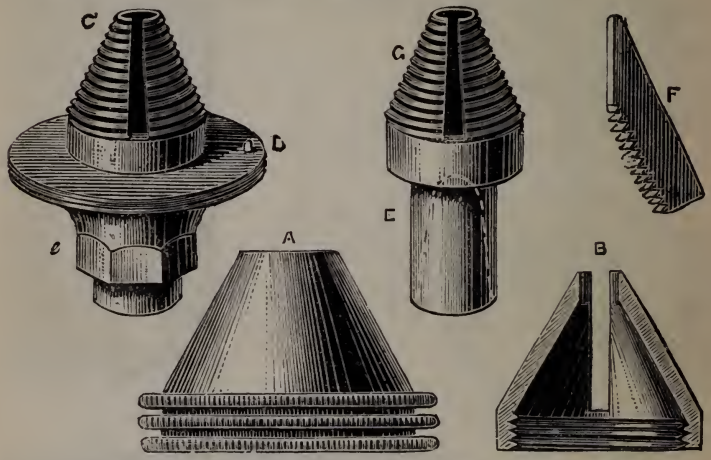

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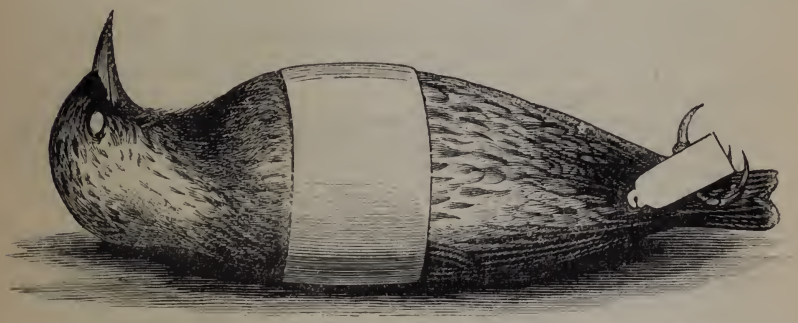

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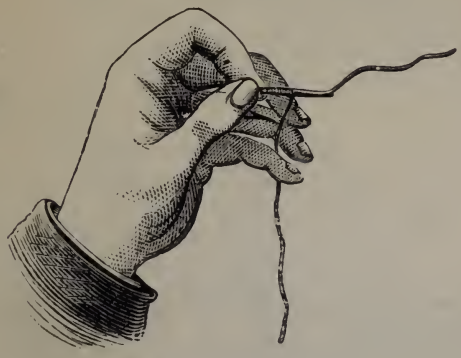

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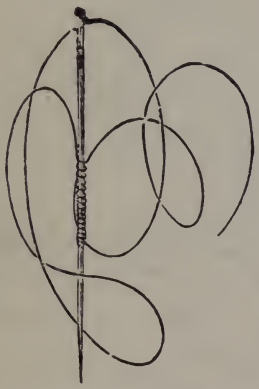

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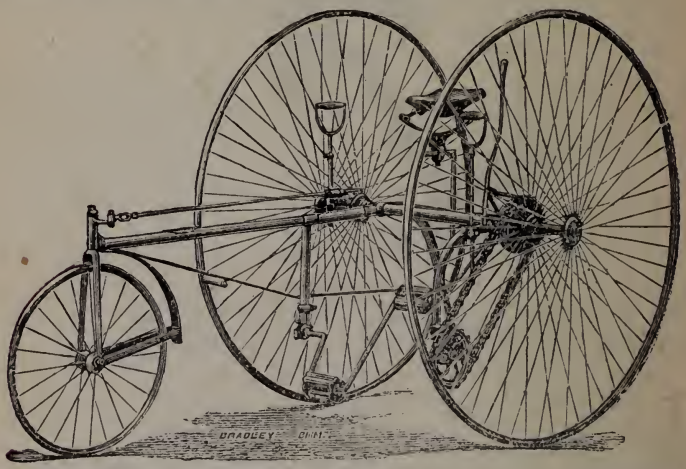

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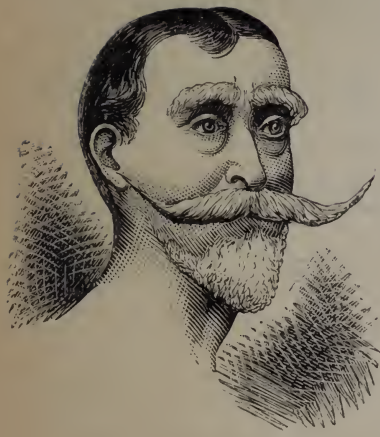

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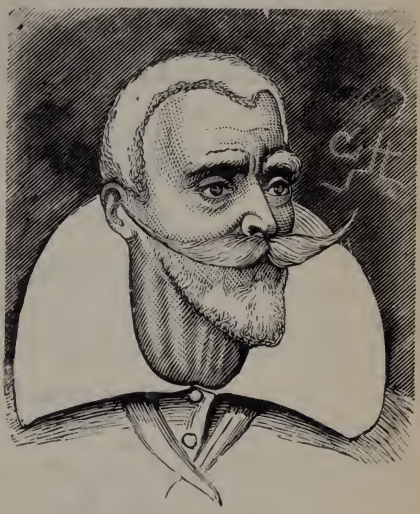

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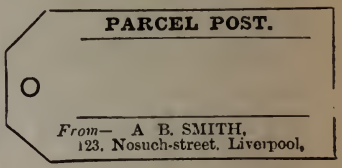

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